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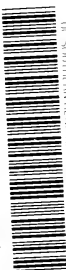
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THE
BOOK OF CREATION

UNFOLDED;

OR,

The Creator as seen in his Works:

INTERSPERSED

WITH ANECDOTES AND POETRY,

AND

INTENDED FOR THE INSTRUCTION OF THE YOUNG.

BY CHARLES HODDINOTT,

AUTHOR OF "THE GOD OF NATURE AND OF THE BIBLE,"
&c. &c.

THIRD EDITION.

LONDON:
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PREFACE.

THE end in view in this series of publications, (of which each part is complete in itself,) as well as the peculiar method of the author in works of this description, will be found explained in the preface to "The Voice of Truth," and will not here be repeated.

What I intend by the "Book of Creation," will be evident to every intelligent reader, and therefore needs no explanation; and those who are conversant with my "Christian Shield" need not be told, that the subject corresponds with that of Essay II. in that volume; though they will find but little similarity either in manner or matter.

On a subject like the present, where the materials are selected from so great a variety of sources, much originality cannot be expected. Yet, although the materials may not be new, possibly the *manner* of arranging and disposing of them may be; as, in this respect, in order to win

the attention of the reader, I have chosen a method entirely my own, and am not aware of having trod in the steps of any of my predecessors.

Amusement blended with instruction, was the end I had in view in my other publications; and, I am gratified in having succeeded, to the satisfaction of a numerous class of readers: at least, if I may judge by their united testimony, in addition to the unbought opinion, elsewhere expressed, by some of the London Reviewers.*

“Fame,” says an anonymous author, “is seldom an object in works of utility. But there is some consolation in the idea, that no man was ever a loser, in the long run, by sacrificing his inclination to his duty.” And I can say, that the drudgery of the work lessened, in proportion as I felt a persuasion, that what I did would be of use to various classes of my fellow-creatures, and to the rising generation in particular. Nor will it be too much to add, that this little work contains (though so unostentatious in its appearance) *the substance of some large and expensive volumes*. Some idea may be formed, by referring to the Table of Contents, of the pleasing variety of subjects here brought forward; and a summary of the

* For the flattering opinion of the Reviewers, see the preface to “The Voice of Truth”

whole work may be found in the concluding section, p. 116—118.

Whatever imperfections may appear in the present performance, they arise, not from the want of a close and vigilant attention to the subject, nor from a lack of suitable materials for the undertaking, but from the multiplicity of objects which here pressed upon me. In such a situation, where so many objects are pleasing, *selection* is by no means an easy work.

In the selection of my materials I have generally compared the statements of different writers on the same subject, to see how far they were agreed; and whenever any thing bore the marks of romance, or appeared too marvellous to gain general credence, I either excluded it altogether, or accompanied it with an observation to that effect. By doing the latter sometimes, an opportunity is afforded to the reader of weighing the probability of a statement which appeared in some measure important.

In so small a work as the present, and intended chiefly for the young, it would have appeared egotistical, and have occupied too much room, had I referred *invariably* to the source from whence I derived any important information; I have, however, occasionally done it at the foot of the page: and where I have not, am not conscious of any

plagiarism, having chosen another and a common method of acknowledging the obligation.

In the numerical parts of the work I have placed the calculations of distances, magnitudes, &c. in words instead of figures; and I offer this apology for what may appear, at first sight, rather singular in this respect—that while an error of a *single* figure might easily creep in, either in the writing or the printing, from some accident or the smallness of the character, and make a very considerable difference, a word in general is much less likely to be mistaken or misplaced, from its being composed of several distinct characters; and I have been at no small pains in endeavouring at first to ascertain the correctness of such statements.

With these explanations, I now open “the Book of Creation” to all such as delight to read therein. And if they do it with the same satisfaction and pleasure as the author, it will give a zest to the passing moments, and, possibly, to the remainder of their days.

C.* H.*

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THE
BOOK OF CREATION
UNFOLDED.

PRELIMINARY OBSERVATIONS.

General Tendency of Nature—Sketch of Atheism and its modern Effrontery—Specimens cited and briefly refuted—Design of the ensuing Work.

THE day had been unusually fine; not a cloud had intercepted the glowing beams of the all-enlivening sun, which was now making rapid advances in the western sky; the din of day had ceased, and the heavens were beginning to assume their accustomed appearance on a fine summer's evening;—when Eugenius, wearied with the turmoils of business, and led by contemplation, sought a solace to his spirits in retirement, where, seated on an eminence, he could command a view of the charming scenery around him.

He had been surveying, for some time, the pleasing prospect, as unfolded to his view in hill and dale, and in the heavens above, when, at length, as

if inanimate nature reproved his long silence, he involuntarily exclaimed, in the language of his favourite Milton—

These are thy glorious works, Parent of good !
 Almighty ! thine this universal frame !
 Thus wondrous they ; thyself how wondrous then !
 Unpeakable ! who sitt'st above these heavens,
 To us invisible, or dimly seen
 In these thy lowest works : yet *these* declare
 Thy goodness, beyond thought, and power divine !

And is it so ? he continued ; and are there those who, unmindful of the evidence incessantly pressing upon their attention, can look upon the magnificent scenery of nature—the sun glowing in the firmament, “ the moon walking in brightness,” and the stars sparkling in the immensity of space—the seasons regularly revolving—the endless variety every where so discernible—the subjection of the inferior tribes to man, the lord of creation,—and not lift their adoring thoughts to HIM whose mandate called them all into being,—

“ Who plann'd, and built, and still upholds a world,
 So cloth'd with beauty, for rebellious man ? ”

Yes, interrupted his friend Lorenzo, who at that moment unexpectedly made his appearance,—yes, my good Eugenius, however absurd and monstrous it may appear, there are such beings in existence ; and who, strange to tell, instead of referring the works of creation to an infinitely wise God, attribute “ surrounding nature, and all its astonishing phenomena, to CHANCE, or to a *fortuitous concourse of atoms* ! ”

Such is Atheism ;—a scheme which deprives us of comfort in life, of hope in death, and of happi-

ness beyond the grave ! The term Atheist is very expressive. It is composed of two Greek terms, (*a* and *Theos*,) and signifies, says Dr. Evans, "*without God*;"—and in this sense the appellation occurs in Ephes. ii. 12, *Without God* (or Atheists) *in the world*. What a melancholy void must there be in the mind of such a one ! Well might *one* exclaim, after viewing the labyrinths of error through which he had passed, and again occupying the vantage ground of revelation,—“ O ye Atheists ! take away our liberty, take all that we have ; put us in a dungeon or on the rack ; but do not endeavour, by your sophistical arguments, to rob us of our God.”

A recent attempt of this kind deserves particular notice ;—an attempt to rob us, not only of our God, but of our Bible, that surest and best guide in the road to heaven. I hold in my hand the pamphlet to which I allude. It is entitled, “ The Character of the Bible and the Bible God ;” and would it scarcely be credited, in this land of Gospel light, and in the nineteenth century, that it contains the most atheistical and deistical sentiments, conveyed in the most authoritative terms, and in terms revolting to the true moralist as well as to the Christian ? Some imagine that the monster Atheism is dead, and that, to the eye of reason and common sense, the evidences of the existence of the Deity are so self-evident and plain, as to require no lengthened discussion ;—but the pamphlet before us (which is a recent production, and has been industriously circulated among our fellow-countrymen) convinces me to the contrary, and shews the importance of what I would propose for our consideration, and for that of the rising

generation in particular. A few specimens from this vile publication will convince you of what I have asserted; and I shall indulge myself in some brief comments as I proceed.

The being of a God, in the first place, it turns into ridicule:—

“The history of God (it says, page 8) is no further the history of a reality than error or frailty is a reality! We must acquire knowledge, and error will vanish.”

But, shall it be such kind of “knowledge” as this, Eugenius? And if there is no reality in reference to the Divine existence, are we quite sure that there is any in reference to our own? Is it not a proof of “*frailty*,” as we cannot comprehend our *own* existence, to suppose that we exist at all? We must acquire some of this writer’s “knowledge,” and such “error will vanish!”

Again in the same page—

“The one true God, *if there had been a true God*, would have triumphed over all others, or never have *permitted* their existence.”

But this is reasoning like a frail and erring man, and supposing God to be *such a one as ourselves*; whereas his ways are *not* as our ways, nor his thoughts as our thoughts. Let us hear somewhat more. In page 7, it is said—

“There has been a common notion among mankind upon the subject of *one God*, or *one most powerful God*. Such a notion is erroneous; and neither antiquity nor numbers can preserve it against the researches of this age displayed by free discussion.”

We are not, however, Eugenius, afraid of this free discussion, nor of the researches of the studious. For, is it not a fact, that the deeper we dive

into the operations of Nature, the more we discover of Nature's GOD? And was not this the conviction of a Newton, and of a host of others who have either explored the starry way or investigated the wonders of these lower scenes?

"Nature, with open volume stands,
To spread her Maker's praise abroad;
And every labour of his hands
Shews something worthy of a God."

In page 6, we have another proof of this writer's adherence to truth:—

"The Jews, Christians, and Mahometans, had no *original* God revealed to them. They were mere *copyists*, and corrupt ones, of the labours and decisions of men of former ages."

That the Mahometans were copyists, we will not deny, for they have borrowed largely from the Jews and Christians; but that the latter were, not the least shadow of evidence is given by this unguarded writer; nor indeed is it in any measure true, as every intelligent reader will allow. Again, in the same page—

The chemist "finds more of his God in his laboratory than elsewhere. It is *there* he obtains the most correct knowledge of Deity. His crucible forms his *best* Bible, and his *best* religion is his profession as a chemist."

We, my dear Eugenius, find *much* of our God in the visible works of his hands, but *more* in the volume of his will. This is a more sure word to which we do well to take heed. This forms *our* best Bible, and *our* best religion is taught therein.

I must beg your patience while I read one or two extracts more. It is really shocking that a man could sit down and deliberately write such direct

falsehoods. Speaking of the Bible, which we are not disposed to give up, Eugenius, in the face of such misrepresentations as these, he says—

“Its descriptions of a Deity are not only contemptible throughout, but often horrible. He is made to assume all shapes and characters, according to the disposition of the writer of the fabled tale; and in no instance a higher or more dignified character than that of a tyrant. The Jews never approached towards any thing like civilization while a nation; and as the idol god worshipped is always made the emblem of the worshippers, so Jehovah has never been painted like a *civilized* or *moral* being!”

And, in another place, adverting to the Bible, he says, in a tone of sceptical insolence—

“It is a string of fabulous contradictions the style is romantic As a piece of history, it has not *one* corroborated truth Science has made such progress as to pronounce the whole a string of lies!” &c. &c.

Did a mere babe in theology read this, he would be able to shew the falsity of every iota. O most perverse unbeliever! we would fain say, Father, forgive him—he knows not what he does.

Once more, and I will not again disgust you with such vile assertions.

“Jehovah is depicted as a ravenous wild beast, that delighted in the savoury smells of burning fats and frying lambs, and who could only be appeased by this perpetual feast of the priests. Such is the God unfolded in this blessed book.” P. 3.

Here I close my extracts. Now is this true, Eugenius, or is it not most untrue? At present I am satisfied with the diversified evidences of the authenticity and divinity of the Sacred Records, contained in the little pamphlet you lately gave me, and which I could wish every young person to be in possession of.* But in reference to the

* See a small work by the Author, entitled “The Voice of Truth,

proofs derivable from the works of Nature, touching the existence of the Deity, I consider them so diversified and plain, that I could wish to see them placed in a more popular and agreeable point of view than they are generally. The dry and unsavoury details too often given, even on this highly interesting subject, disgust those who are not used to great mental exertion; while the young speedily turn away, completely wearied in the pursuit. We are not *all* philosophers, Eugenius, neither are we *all* satisfied with bare reasoning. The object should ever be—to blend instruction with amusement, to inform the judgment, and harmonize the heart. *Conciseness* too must be aimed at, and *portability*, as the enemy derives much of his advantage, in the present state of literature and the arts, from the two last-mentioned qualities. Thus we shall become all things to all men, that we may gain the more.

I propose, therefore, from what I know of your method, that our future evenings should be devoted to a survey of the various appearances of Nature, including an enquiry into the wonders of modern astronomy, &c. by way of demonstrating the existence of the Deity, and evincing the absurdities of Atheism. This will occupy many of our leisure, and (thus occupied) not unprofitable hours; and as you are my senior, I shall leave the chief discussion of the subject to you—satisfied you will choose that method of instruction which will prove at once both pleasing and profitable.

I am quite of your mind, Lorenzo, and shall willingly accept your invitation. I could wish, indeed, that all parents could make a declaration similar to the parents of young Durant, who, in the memoir I was reading of him the other day, remark—"We began *very early* to point out to him *the existence of a God*; and made him acquainted, equally early, with the leading *evidences of divine revelation*." As a parent, I am anxious to do the same; and, as I know you will not object to it, will step in and invite the young Horatio to our banquet—whose inquisitive mind will gladly avail itself of such an opportunity.

SECTION I.

OF THE HEAVENLY BODIES.

*First Division—The Sun, the Centre of the Solar System.**

The expanded spheres, amazing to the sight,
Magnificent with stars and globes of light;
The glorious orbs which heaven's bright host compose;
The imprison'd sea, that restless ebbs and flows;
The fluctuating fields of liquid air,
With all the curious meteors hovering there;
And the wide region of the land, proclaim
The Power Divine that rais'd the mighty frame.

BLACKMORE.

IN a few moments Eugenius returned with the young Horatio; and, all things being arranged, they proceeded to the subject before them.

In looking for the evidences of the existence of a God, said Lorenzo, where shall we begin? whither

* The sun, together with the several planets that move around it, and to which that luminary communicates light and heat, compose what astronomers call the Solar System.—*Ferguson in Guthrie's Geograph. Gram. vol. i. introduc. p. xi.*

shall we turn our wondering eyes? For, as the poetical Gay very properly expresses it,—

Whether amid the gloom of night we stray,
Or our glad eyes behold revolving day;
Still Nature's various face informs our sense
Of an all-wise, all-powerful Providence.

Let us, resumed Eugenius, as you have imposed the task upon me,—let us begin by surveying “those immense globes that roll above us,” and the wonders of the airy regions. We may afterwards descend to this earth on which we tread—the sea and its phenomena—the vegetable and mineral kingdoms—and, lastly, the various tribes of creatures which creep upon the surface of the earth, skim the air, cut the watery element, or inhabit other parts of the terraqueous globe.

And whatever knowledge we attain unto on these subjects, instead of engendering pride, let it have the humbling tendency it had upon the great Sir Isaac Newton, who, the more he knew, instead of being puffed up by his attainments, felt that he comparatively as yet knew nothing; and who, at the close of his life, when reviewing his aggregate knowledge, is said to have compared himself to a boy that had been picking up pebbles upon the sea-shore, unmindful of the great ocean which lay before him.

“The scene we behold is truly magnificent; but that which our view cannot take in at once, we may divide and enjoy by parts.” And as the sun, the centre of the solar system, and great luminary of the world, (which has been styled the soul of the universe,) is still lingering in yonder

beauteous clouds, which, as Hervey observes, it has arrayed in crimson, and skirted with gold,—let us detain the heavenly traveller awhile, and enquire somewhat into the wonders of his history, with which we are so nearly concerned, from the great and unvarying influence he has upon our individual and collective destinies.

If, as I have observed in my Christian Shield,—if we turn our eyes on high, and survey the material heavens, adorned with the varied clouds and canopy of blue, do we not there see that “the heavens declare the glory of God, and the firmament sheweth his handy-work?” Can we behold the effulgence of the sun, the glorious king of day, and not have our minds insensibly led to that great Being, who sent forth his fiat that the lamp of heaven should pour his vital heat around, and be the glory of our lower world? How wonderful is this “soul of the universe!” and how blind must he be, who can contemplate its amazing history, and not feel persuaded that it is guided by the laws of order, and the appointments of HIM who moves its chariot-wheels according to prescribed and proper bounds! If this lamp of day be viewed only with the eye of the vulgar, it would be surprising if the mind were not filled with wonder and veneration for its great Author; but if we view it in connexion with the discoveries of astronomy, (and especially of modern astronomy,) as demonstrated by Newton and others, it would be far more surprising that any, in such a view, could embrace the absurdities of Atheism.

The sun, the object of our present enquiry, was long considered a globe of fire, but is now believed

to be an opaque (or dark) body, like the planets, having a diameter of eight hundred and eighty-three thousand two hundred and forty-six English miles, and said to be about a million times larger than the earth. How, then, is it the source of light as well as heat? To this some have answered, "From the luminous atmosphere which surrounds the sun coming in contact with the atmosphere of the planets;" in a somewhat similar manner to the collision of flint and steel, which, although they are cold bodies, when struck together immediately emit fire. And, "the spots on the sun are supposed to be his opaque body appearing through the luminous atmosphere, when any part of it is more rare or thinner than usual."* That the sun is *not* a body of fire appears probable from this circumstance, that the tops of mountains and higher regions are frequently covered with snow and ice, and are intensely cold, while the valleys and parts below are scorched by the solar heat.

"The sun," as you are aware, Lorenzo, "is the common centre of all the planetary and cometary system; around which our earth and the planets and comets move, at different periods and distances." Although we are in the habit of speaking of the sun as if it were *not*, it really *is* a fixed body, save its turning on its own axis, (which it does in about twenty-five days :) and its rising in the east and setting in the west is occasioned, not by any motion of its own, but by the turning of the earth

* "Pinnock's Catechism of Astronomy:" from which, and "The Arts of Life and Society," 8vo. (both modern works, and containing the recent astronomical and other discoveries,) I have derived many useful hints.

(of which I shall presently treat) on its own centre. Thus, metaphorically speaking, the sun's chariot-wheels are never at a stand; and, under the direction of infinite Wisdom, the day dawns in one part of the world while the night succeeds in another.

“When to the western main the sun descends,
To other lands a rising day he lends:
The spreading dawn another shepherd spies,
The wakeful flocks from their warm folds arise:
While we in sleep's embraces waste the night,
The climes opposed enjoy meridian light;
And when those lands the busy sun forsakes,
With us again the rosy morning wakes;
In lazy sleep the night rolls swift away,
And neither clime laments his absent ray.”

The universality and regularity of the sun's influence, (as I have elsewhere remarked,) seems to indicate an all-directing Power. The sun does not shine upon our world to-day and disappear to-morrow, leaving us in total darkness, (which would not be an unlooked-for result did it shine merely *fortuitously, independent of a Deity*,) but uniformly continues his beneficent rays, dispensing his light and heat on the inhabitants of every clime, on “the evil and the good, on the just and the unjust.” Unlike the partial influence of an earthly monarch, *his* dominion is the globe itself, and his subjects the unnumbered beings which fill the universe! The hardy Russian, the untutored American Indian, the dark African, the rude Arab, and the more polished sons of Albion, participate in his genial warmth, and share his benevolent rays. Impartial in his influence, he sheds his propitious beams on the humble cottage of poverty as well as on the palace of royalty—on the most abject slave in common with his haughty lord.

In conclusion, Lorenzo, the convenient distance and determinate magnitude of the sun, evinces Wisdom of no ordinary kind. It is said to be ninety-five millions of miles from the earth; and if, says Stackhouse, it were nearer us, we should be scorched to death; if further from us, we should not be able to live for want of heat! Its size evinces the same Wisdom, and is equally adapted to its situation and distance; for, although the sun is the largest and most conspicuous object in the solar system, and is, as just hinted, about one million times larger than the earth, it is so wisely ordained, that, (says the above writer,) if it were larger, it would set the earth on fire; if smaller, it would leave us frozen!

I make no comment on this, Lorenzo, nor is it needed; for if there are not here palpable evidences of Divine superintendence, there are none to be met with in the creation of God.

SECTION II.

OF THE HEAVENLY BODIES.

Second Division—The Planets.

NEXT to the sun, let us (as an important part of the solar system) advert to the planets, which are “opaque bodies that move round the sun from west to east, in orbits nearly circular.” Of these there are eleven, with their tributary satellites or moons, namely—

- | | |
|------------------------------|---------------------------------|
| 1. Mercury. | 8. Vesta. |
| 2. Venus. | 9. Jupiter, and his four Satel- |
| 3. The Earth, and its Satel- | lites. |
| lite the Moon. | 10. Saturn, and his seven Sa- |
| 4. Mars. | tellites. |
| 5. Ceres. | 11. Uranus, or the Georgium |
| 6. Pallas. | Sidus, and his six Satellites. |
| 7. Juno. | |

You are well aware, Lorenzo, that my object is not display, neither do I for a moment pretend to set myself up for an astronomer, in the general acceptance of the term;—all I intend, in this part of our investigation, is, to glance at the more prominent features of the heavenly bodies, that seem

irresistibly to lead us to their Great First Cause. Nor let us, in reference to these, or the phenomena of what has gone before or may hereafter follow, give place to the doubts of a sceptical mind, because there are heights and depths in their history which we cannot explain;—for if we admit the truth of nothing but what we can comprehend and thoroughly understand, we shall be obliged to reject, not only the phenomena of *their* history, but a large portion of *that* of the globe itself, and of our own nature in particular.

Of the planets I shall speak with brevity, and (for the sake of being understood) shall use great plainness of speech. Thus we shall the more readily accomplish the end we have in view—the glorification of the Great Former of the universe, and the extracting of matter for devotion and praise.

1. Mercury.—This and Venus are called *inferior* (or interior or inner) planets, from their moving *within* the orbit of the earth, and being nearer the sun than the rest of the planets. The latter, from being *without* the earth's orbit, are called *superior* (or, as Ferguson suggests, perhaps more properly, exterior or outer) planets. Although Mercury is the nearest to the sun, round which he moves with great velocity, yet, is not this *nearness* astonishing, when it is estimated at about thirty-seven millions of miles! He is said to be the smallest of the inferior planets, his diameter being about three thousand miles; is observable by the naked eye chiefly in the southern parts of the world; goes round the sun in eighty-seven days and twenty-three hours; and moves at the amazing rate of ninety-five thousand miles an hour!

2 Venus.

“ Fair Venus next fulfils her larger round,
 With softer beams and milder glories crown'd;
 Friend to mankind, she glitters from afar,
 Now the bright evening, now the morning star.”

The diameter of Venus, which is, as just hinted, an inferior (or interior) planet, and second from the sun, is said to be seven thousand eight hundred and sixty-seven miles, and she is distant from the sun sixty-nine millions of miles! She moves at the rapid rate of eighty thousand nine hundred and ninety-five miles per hour; performs her course in two hundred and twenty-four days, sixteen hours, and forty-nine minutes; turns on her axis in twenty-three hours, twenty-one minutes; is of a very bright appearance; and sometimes a morning and sometimes an evening star, according to her situation in the heavens. She is said to be an *evening* star when *east* of the sun, when she sets after him; and a *morning* star when *west* of day's bright luminary, and then rises before the effulgent monarch.

And here I cannot but pause for a moment to notice the undeviating regularity with which these vast bodies move. “The planets,” says Stackhouse, “and all the innumerable hosts of heavenly bodies, perform their courses and revolutions with so much certainty and exactness as never once to fail; but, for almost six thousand years, come constantly about in the same period to the hundredth part of a minute!”

How much opposed is all this to the spirit of Atheism! 'Tis strange, 'tis passing strange, if such constant order is observed by no law but that of

chance; and that these glorious bodies should maintain their uniform stations for thousands of years, unless they are guided by that unerring Hand, which, we maintain, set all their wheels in motion. Rather than refer them to the operations of a blind, unconscious agent, may we not rationally say with Addison—

In Reason's ear they all rejoice,
And utter forth a glorious voice;
For ever singing, as they shine,
"The hand that made us is Divine!"

3. The Earth, though not called an heavenly body, yet, as it is the planet on which we live, must (with its satellite, the moon) come in for a share of our attention;—though its productions, which are foreign to the present point, must be reserved for a future stage of the enquiry.

The earth, says Ferguson, was long viewed as an extensive plain, and the heavens were thought to be at no great distance from it, and designed only for its ornament or illumination. This hypothesis, it appears, was at last discovered to be erroneous, and it at length appeared to be a planet, of a globular form, performing its *diurnal* motion round its own axis every twenty-four hours, the cause of day and night—and its *annual* evolution ("the absolute motion of its whole body in its orbit round the sun") in about three hundred and sixty-five days six hours, the length of our current year; thus producing the change of seasons, according to our nearness to or distance from the sun.

"The earth, obliquely circling round her sphere,
Leads on the varying seasons of the year;
While on her axle she revolves with speed,
The days and nights alternately succeed."

I mentioned, just now, the globulous form of the earth; and here permit me to say, in the language of a learned writer, that “we have this recommendation of the globular form of the universe, that it is far more magnificent, and worthy of the infinite Creator, than any of the narrow schemes.” So much do the discoveries of modern astronomy exalt our conceptions of the great Former of all.

The diameter of the earth is said to be about eight thousand miles, and its circumference twenty-five thousand five hundred and forty-two; its distance from the sun ninety-five millions of miles; and it is supposed to move at the vast and amazing rate of sixty-eight thousand eight hundred and fifty-six miles in an hour. “Such enormous magnitude! winged with such prodigious speed! it raises astonishment beyond expression.”

Now if, Lorenzo, when this wondrous speed is considered, we ask how it is that we are insensible of the rapid movement of the earth, I answer, in the words of a modern publication, “Because the atmosphere,” (of which hereafter,) “and every thing on the earth’s surface, are carried round with it.” Nor need we (so has the wise Creator ordained it) be any way fearful that bodies on the earth will fall off, when she is winging her way so rapidly through boundless space, since “they are retained by the law of attraction or gravitation,” (of which I shall presently treat,) “which acts on all bodies as the loadstone does on iron.*

Of the Moon, though only a secondary planet, or satellite of the earth, about which she revolves,

* Vide “Catechism of Astronomy,” a useful little work.

and throws across it her silvery rays, so pleasing amid the nocturnal scenery of the heavens,—of this fair visitant, which sages have immortalized, and concerning which poets have so often sung, because so extremely interesting to us, and by no means little in *our* account,—I shall perhaps be excused if I speak somewhat at large.

Not long since, the sun was publishing his Maker's power and telling of his goodness; and now the moon, attended by her numerous train, is speaking the same truth, and proclaiming in the ears of Reason, "God made me."

"Soon as the evening shades prevail,
The moon takes up the wondrous tale,
And nightly, to the listening earth,
Repeats the story of her birth;
While all the stars that round her burn,
And all the planets in their turn,
Confirm the tidings as they roll,
And spread *this* truth from pole to pole."

Yes, yonder moon, as she "walketh in brightness," is a mute but powerful reprover of Atheism. Hence, in connexion with other portions of creating power, as an inspired writer argues, (Rom. i. 20.) the sceptic is "without excuse," since "the invisible things of God, from the creation of the world, are clearly seen, being understood by the things that are made—even his eternal power and Godhead." Hence too, the Atheist, in professing himself to be "wise," becomes a "fool:" for no idiocy surely is greater than to deny the being of a God, when all nature so loudly proclaims his existence.

The distance of the moon (denominated in Holy Writ the Queen of Heaven) from the earth, is said

to be two hundred and forty thousand miles, and her diameter is two thousand one hundred and eighty. Her apparent magnitude arises from her comparative nearness to the earth, to which she is of various uses, by regulating the tides,* dissipating the gloom of night, &c. Although *to us* she appears so large, astronomers say that the moon is much less than either of the inferior planets. The fact of her light being borrowed is well known; she reflects the light of the sun when our world is turned from that monarch, and thus throws across the otherwise dark scenery of nature, some of her less glowing but cheering beams. This fact is well expressed by the poet:—

“The silver moon her western couch forsakes,
And o’er the skies her nightly circle makes;
Her solid globe beats back the sunny rays,
And to the world her borrow’d light repays.”

Did the moon shine with her own native and unborrowed lustre, it seems she would always appear full, like the luminary of the day; but she varies in her appearances because she is tributary. Sometimes she exhibits only a slender streak, at others, half unveils her lovely face. Anon she appears in her full beams, and shines forth in unclouded and unsullied majesty. What we call a *new moon*, is when the dark side of the moon “is turned towards the earth, which happens when she is between the sun and the earth;” and what we call a *full moon*, “is when her illuminated side is turned towards the earth, which takes place when

* See section viii.

the earth is between the sun and the moon." The cause of her motion is attraction; and she revolves round the earth in about twenty-nine days, twelve hours. Hence the division of the year into months. If we view her as placed in the heavens *merely* to communicate light to our world, our admiration must be excited towards her adorable Author;—but if we view her as *a world*—which she probably is, since astronomers assert that the telescope discovers mountains, hills, and valleys in her—if, I say, we view her as *a world*, teeming with plenty, and inhabited, perhaps, by a superior race of beings,—we are lost in the immensity of the Divine operations, and exclaim, with delight and astonishment, "Great and marvellous are thy works, Lord God Almighty! who would not fear thee, thou King of saints!"

With this view of the subject, I am not surprised to find poets, philosophers, and sages, of different ages and countries, celebrating the praises of this fair luminary. You have not forgotten that unrivalled night-piece of your favourite Homer—"As when the moon, refulgent lamp of night," &c. (*Iliad* viii.) nor the charming melody of the divine Milton, who sings of "the moon full-orbed;" nor the inference drawn from her majestic appearance by the Royal Psalmist—"When I consider the heavens, the work of thy fingers; the moon and the stars, which thou hast ordained; Lord, what is man, that thou art mindful of him? and the son of man, that thou visitest him?" (*Ps.* viii. 3, 4.)

I think, interrupted Lorenzo, the heavenly bodies *alone*, duly considered, are enough to confound the most subtle advocate of Atheism. And

surely—as the poet has well expressed it—surely,

“An undevout astronomer is mad!”

But, we must not stay to augment our reflections, and to argue the matter here, as you intend to combine them at the end of the discourse. You will, therefore, Eugenius, when we have taken some refreshment, (of which we now stand in need,) proceed with your description of the planets.

The Planets continued.

Eugenius, after a short pause, resumed his discourse on the heavenly bodies.

4. Mars is the next in order. Of this planet I briefly observe, that his appearance is globular, and he is said to be less bright than any of the others; his diameter is estimated at four thousand one hundred and eighty-nine miles; and he is distant from the sun one hundred and forty-four millions of miles—although he derives his light from the latter, round which he revolves.

5. Ceres.—This planet was discovered by the moderns, so recently as 1801. Her diameter is only one hundred and sixty-five miles, but her distance from the sun is two hundred and sixty millions of miles! And she performs her revolution round the latter in four years, two hundred and twenty-one days, twelve hours.

6. The planet Pallas was discovered the year after Ceres; that is, in 1802. Her diameter, ac-

according to the computation of Dr. Herschel, is thirty miles, and her distance from the sun two hundred and sixty-six millions of miles. She takes four years, seven months, and eleven days, to go round the sun.

7. Juno, which was discovered so lately as the year 1804, is distant from the sun three hundred millions of miles, and makes her tour round the latter in the space of four years, one hundred and twenty-eight days. It appears that her diameter is not precisely ascertained.

8. Vesta, the next that claims our attention, is a modern planet, discovered so late as the year 1807; and, although her distance and magnitude are not yet correctly known, she is said to make her circuit round the sun in three years, sixty-six days, four hours.

9. Jupiter and his satellites.—The more, Lorenzo, we explore the planetary system, the further we are getting from the frozen and chilling regions of Atheism. If we have wondered at the magnitude of some of the planets, how will this wonder be increased by the contemplation of Jupiter! This, it appears, is the largest planet, its diameter being eighty-nine thousand one hundred and seventy miles! He is said to be distinguished from the other planets by his brightness and magnitude. The time of his revolution round the sun is eleven years, three hundred and fourteen days, twelve hours, and twenty-three minutes, moving at the amazing speed of twenty-five thousand miles per hour; and is four hundred and ninety millions of miles from the sun!

Beyond this it may be observed of Jupiter, that,

because of his remoteness from “day’s all-cheering source,” he is naturally deficient in reference to the light borrowed from that luminary, he has four satellites or moons, which revolve about him, (some little inferior to the earth in size,) and which afford him their diffusive light and influence. “The first satellite is two hundred and sixty-two thousand miles distant from Jupiter; the second, four hundred and twenty-three thousand; the third, six hundred and seventy-six thousand; the fourth, one million one hundred and eighty-nine thousand miles!”

“These friendly moons with borrow’d lustre rise,
Bestow their beams benign, and light his skies.”

10. Saturn and his satellites are fraught with equal wonders. He is “one of the most stupendous of the planets,” although to appearance only a small speck, and “shines with a pale feeble light,” in consequence of “his immense distance from the sun and from the earth.” His diameter is stated by some to be about seventy-nine thousand miles; he is distant from the orb of day nine hundred millions of miles, and is near thirty years in his journey round it. Among the phenomena peculiar to this planet, may be named the two luminous rings, one without the other, by which he is surrounded, which are frequently full as bright as the planet itself, and in general not much inferior. Their nature and uses are undetermined. Besides these, he has *seven* satellites, at different distances, which “move round him nearly on the plane of the rings,” and which mark his history as truly wonderful.

11. Uranus, or Georgium Sidus, was discovered by Dr. Herschel at Greenwich, in the year 1781, and “is the most remote planet known in our system.” He is said to be barely visible to the unassisted eye, by reason of his immense distance from the earth. His diameter is thirty-five thousand one hundred and twelve miles, and he is distant from the sun one thousand eight hundred millions of miles! Nor less astonishing is the velocity with which he moves, which is stated to be seven thousand miles an hour! He is known to have six satellites, and it is thought may have many more than have yet been discovered.

Thus, Lorenzo, have we glanced at some of the wonders connected with the solar system, where the skill (if I may use the term) of Jehovah, is so eminently displayed. “Lo, these are *parts* of his ways.” Yet, slight and imperfect as is the present sketch, I think it sufficient for my purpose, were there no other wonders in reserve to establish it more fully. “Instead of indulging in useless speculations, when contemplating the wonders of the celestial bodies, we should ever bear in mind, that *He* who formed them was capable of sustaining and supplying the creatures he placed in them (supposing the planets to be habitable globes like our own) with every thing suited to their necessities. Do we not see that some creatures are formed for living in the water, and others under ground? And is it unlikely, then, that the inhabitants of the planetary orbs are fitted for the enjoyment of the situation in which they are placed? Surely nothing ought to excite vulgar astonishment, or weaken our belief in any part of the harmonious

and beautiful system of the universe, the work of an Almighty Power—whose magnificence and transcendent grandeur, our most enlarged ideas are totally unable to comprehend.”*

At present I abstain from further comment; and, as we have protracted our enquiries to an unusually late hour, let us turn our attention to those glittering gems, the stars—which bespangle the boundless heavens, and “teach as well as shine.”

* Catechism of Astron. note, p. 16.

SECTION III.

OF THE HEAVENLY BODIES.

Third Division—The Fixed Stars.

..... "The glittering stars,
By the deep ear of meditation heard,
Still in their midnight watches sing of Him.

THOMSON.

AFTER the most minute enquiry, Lorenzo, into those gems which we denominate the fixed stars, we are obliged to revert to the interrogatory of Holy Writ—"Canst thou by searching find out God? canst thou find out the Almighty to perfection?" When we have explored our way for millions and millions of miles, we are overcome by the pursuit—we return again to earth—we leave the distant glories of which we have had a glimpse—till another, and a better state, (when we shall be fitted to the employment,) shall reveal more fully their sublime and exalted history. In the mean time we may avail ourselves of our imperfect knowledge, inasmuch as it is calculated to lift us above these lower scenes—even to the High abode of Him who is the great Author of all,

And what thinkest thou, Lorenzo, of yonder innumerable stars, which sparkle in the immensity of space? Thinkest thou they were placed in their orbits by the hand of chance, and hold their station under no better regulation? How absurd the idea! It were equally rational to deny our own existence. Methinks, were it possible for the Atheist to strike the sun and the moon from the fair face of creation, the stars, glittering in the blue expanse, would alone be sufficient to confound his sagest pretensions.

We now, as some one observes, turn over the most sublime page in the Book of Creation. "The fixed stars," says Ferguson, "are distinguished by the naked eye from the planets by being less bright and luminous, and by continually exhibiting that appearance which we call the twinkling of the stars. This arises from their being so extremely small, that the interposition of the least body, of which there are many constantly floating in the air, deprives us of the sight of them: when the interposed body changes its place, we again see the star, and this succession being perpetual, occasions the twinkling. But a more remarkable property of the fixed stars, and that from which they have obtained their name, is their never changing their situation with regard to each other, as the planets, from what we have already said, must be always changing theirs."

These stars, as they can receive no light from the sun on account of their immense distance from it, and afford no light to our earth from the same cause—and as many of them require a good telescope to get a glimpse of their twinkling—are very naturally supposed to be suns, having worlds

revolving round them, of which they are the centre, and to which they communicate their light and influence. And, because of their immense distance, which is said to defy human calculation, it is reasonably concluded, that were our sun, though now so bright and glowing, placed at the same distance, it would appear as small as any one of them.

“Consult with Reason, Reason will reply,
Each lucid point which glows in yonder sky,
With beams unborrow'd brightens other skies,
And worlds to thee unknown with heat and life supplies.”

The number of the fixed stars is by no means determined. A thousand have been seen with the naked eye on a very clear night, and the telescope discovers a much larger number; but astronomers suppose that a thousandth part has not yet been discovered. Dr. Herschel is said to have seen in the Milky Way, (which is “a streak of light running across the heavens, generally in the time of frost, and when the moon is invisible,”) in one hour, by means of the telescope, fifty thousand stars! They are divided into constellations, by which is meant an assemblage of neighbouring stars, which are considered as resembling animals, &c. and receive their names accordingly, such as Ursa Minor, or the Little Bear; Ursa Major, or the Great Bear; the Wolf, the Compass, and so on. “The northern hemisphere contains thirty-four constellations, including both the ancient and modern;” and the southern a much larger number. Besides these there are a number which are denominated unformed stars. They also vary in their apparent magnitude.

“Instead then of *one* sun, and *one* world only, in

the universe, as the ignorant in astronomy imagine, that science," says Ferguson, "discovers to us such an inconceivable number of suns, systems, and worlds, dispersed through boundless space, that if our sun, with all the planets, moons, and comets belonging to it, were annihilated, they would be no more missed by an eye that could take in the whole creation, than a grain of sand from the sea-shore!" At least, so says my author: and facts, in addition to the testimony of other respectable writers, seem to confirm it.

"What an august! what an amazing conception! (if human imagination *can* conceive it,) does this give of the works of the Creator! Thousands of thousands of suns, multiplied without end, and ranged all around us, at immense distances from each other, attended by ten thousand times ten thousand worlds, all in rapid motion, yet calm, regular, and harmonious, invariably keeping the paths prescribed them; and these worlds peopled with myriads of intelligent beings, formed for endless progression in perfection and felicity!" And, "if so much power, wisdom, goodness, and magnificence is displayed in the material creation—how great, how wise, how good must HE be, who made and governs the whole!" "All these glories are *His*, and yet He cares for *me*!"

..... "But I lose
Myself in Him, in light ineffable!
Come then, expressive silence, muse his praise!"

SECTION IV.

OF THE PHENOMENA OF THE HEAVENS.

Comets—Eclipses—Northern Lights—Attraction or Gravitation—Air or Atmosphere—Winds—Clouds—Water-Spout—Rain—Hail—Snow—Lightning—Thunder.

THE excursion to the solar and planetary system having proved so agreeable on both sides, it was determined that a similar meeting should take place on the next evening, to discuss other wonders of the material world, so large a portion of which was yet unexplored.

Passing by, somewhat hastily, said Eugenius, the flaming comet, which strikes such terror into the mind of the uninformed and superstitious, but which is supposed, by astronomers, to be “an opaque heavenly body like a planet, moving in its own orbit, which is very eccentric, and presenting an appearance of being bearded, tailed, or haired, according to its position;” and which has its regular periods of revolution round the sun, though, from its orbit being so extensive, and its returns so

few, much of its history is yet in the bosom of futurity;—passing by the general theory of eclipses of the sun and moon—the former of which is briefly said to be “a darkness occasioned by the moon passing between the sun and the earth, and obstructing the rays of light;” the latter “by the earth coming between the sun and the moon;”—also the *Aurora Borealis*, or northern lights, the phenomena of which “are supposed to arise from electric matter, and particles of the nature of lightning,” supplying in the polar regions, in some measure, the absence of the sun, by their vivid and brilliant light:—passing by these, let us advert for a moment to a subject of quite a different nature, but one which, since the discovery of it by Sir Isaac Newton, explains many of the phenomena of the heavens and the earth, and accounts for many apparent impossibilities in the world around us. The subject to which I allude is the law of attraction or gravitation. Attraction is briefly defined—“a certain principle in nature, by which all bodies and particles of matter tend towards each other.” And “the attraction of gravitation is that law, or principle, by which the planets, satellites, and comets, tend towards the sun, and towards each other.” Thus the earth and the planets are kept in their proper station, and poised so wonderfully, though rolling in the immensity of space, and hanging, as it were, upon nothing. Thus the sun is the centre of attraction, around which the mighty masses move, according to their several distances. Thus we account for many things which come under our daily observation, the causes of which would otherwise be to us

unknown. And thus are we relieved from all anxiety in reference to the jarring or concussion of the worlds around us, the anticipated destruction of which might otherwise fill us with dread.*

What think you, interrupted Lorenzo, of referring this wonderful law of the universe, to blind, uncertain chance—the Atheist's God?

Think! why I should as soon think of referring the mechanical operations which are going on yonder, that display such admirable contrivance and ingenuity, to the same unconscious agent. No, Lorenzo—there is something here, as in all the laws of nature, which plainly intimates the existence of *Nature's God!* And happy is he who can identify his Father's hand, in the daily management and control of this wondrous law.

Let us now, continued Eugenius, turn our attention to the atmosphere, or the air that encompasses the earth on all sides—the element in which we breathe—without which we could not live—and whose properties are so wonderful. The height of the atmosphere is supposed to be about forty miles above the earth, and becomes gradually thinner and lighter towards the top. Its pressure is said to be about fifteen pounds upon every square inch; and we sustain the pressure because we are ourselves filled with the subtle fluid, “and pressed by an equal force on every side.” Its properties are many; one of which was just explained. In addition may be mentioned, that though invisible, it

* It is remarkable, that the falling of an apple from a tree in an orchard, is said to have been the origin of Sir Isaac Newton's theory of attraction or gravitation.

is the vehicle of sounds and of smells, the nourisher of vegetation and nutrition in animals—and the alleviator of burning and intense heat. It moreover swells the canvass of the mariner, and wafts him to distant shores—scatters a variety of seeds, which take root in various parts of the earth.*—and is the medium of innumerable blessings to mankind. Without it, how vain were the music of yonder grove! how vain the essays of the birds to expand their silken wings! And how much of that pleasing sensation, derived from the odoriferous fields and groves, would be unknown to us on the present occasion! “O Lord, our Lord! how excellent is thy name in all the earth!” (Psalm viii. 1.)

When air is put in motion, we call it *wind* in general: and a breeze, gale, or storm, according to the quickness of that motion.† There are several kinds of winds, each of which has its appropriate appellation, viz. regular winds, or trade winds, which greatly facilitate the course of the mariner on the ocean—periodical winds, of which number are the monsoons—sea and land breezes—variable winds, and whirlwinds. And such is the wise ordination of Providence, that “boatmen often see a wind coming by the dark curl that it makes upon the surface of the waters, and thus have time to guard against its effects.”‡

But, as “the atmosphere is the scene of the meteors; and therein is collected the matter of rain, hail, snow, thunder, and lightning, and a great many other things observable in the air;” let us

* See section v.

† Guthrie's Geography, vol. i. introduc. p. xlii.

‡ Arts of Life and Society, p. 89.

take another excursion into the aërial regions; and, not content with grovelling upon the earth, ascend, as it were, to

“Rain’s fountain head, the magazine of hail,
The northern nests of feather’d snows,
The brew of thunders, and the flaming forge
That forms the crooked lightning.”

Clouds, which are the grand repository of the watery element on high, first demand our attention. Without these, so nicely borne up in the air above us, and poised upon nothing, what a universal dearth would there be on the earth’s surface, which is now covered with verdure and beauty! The clouds are a collection of vapours drawn from the earth and the sea, and raised into the air by the heat of the sun. The dark cloud in the air, which, at certain seasons, descends towards the water of the ocean by a conical projection, and is termed the *water-spout*, is a phenomenon well worthy of our attention. “The water thus raised gradually mingles with the circulating air, and forms itself into a cloud; and from the circumstance that little or no salt is contained in the water deposited by water-spouts, it should seem that the whole water is raised by a process analogous to very rapid evaporation.”* These clouds, when thus raised on high, (according to the appointment of infinite Wisdom,) afterwards descend in fructifying showers, and are the occasion of innumerable blessings to the various tribes of the earth. Hail, it seems, according to the philosophy

* Library for the People, p. 92.

of Mr. Locke, is occasioned by the drops of rain freezing in their falling—and snow is said to be the small particles of water frozen before they unite into drops. “By the breath of God frost is given: out of the south cometh the whirlwind, and cold cometh out of the north. He saith to the snow, Be thou on the earth; likewise to the small rain, and to the great rain of his strength. With God is terrible majesty!” (Job xxxvii. 6, 9, 10, 22.)

But see, Eugenius, exclaimed Lorenzo, how the lightning is “glancing with forked fury from the angry gloom!” And hark! the distant peals of thunder—how they burst upon the astonished ear, and hold the most sceptical in dumb amazement! “With God, indeed, is terrible majesty!” Who can conceive the strength of that arm which wields the thunderbolt—which scatters the lightning—which commands the whirlwind? Yet, what a happiness to reflect, that these elements are in *His* hands, and subject to *His* control, who is “wonderful in power and excellent in working!”

Yet while I paint the dreadful scene, I start;
My bosom scarce can hold its panting heart.
Hark! tremble!—murmurs in the distant air
Whisper of God—His awful way prepare!
He fires the heavens; earth to her distant shores
Feels the broad flashes; now his thunder roars:
His voice exalted with majestic sound,
Augments its terror through the vaulted round:
Great is the thundering God, and great his deeds;
Nor less his work our loftiest thoughts exceeds.

SCOTT.

But let us not, resumed Eugenius, be terrified at the scene before us. Let us remember that these storms rage not in vain; but, by means of them,

the air is purged and cleansed of its impurities or unwholesome vapours, and swarms of insects, which might prove very destructive to vegetation, are destroyed. Respecting the cause of the electric shock, I would just read a short extract from a book now before me, which may prove very interesting. “*Lightning*, whether it takes place as a communication between one cloud and another, or between a cloud and the earth, is merely an effort of nature to restore the two substances between which the lightning passes to the same electric state; and it is violent in proportion to the different states previous to the discharge. The *thunder*, or noise, is the mere mechanical consequence of the lightning: the great heat which the lightning produces in its rapid course, expands the air to almost a vacuum; and, the tendency of the air to come together after the instantaneous fire passes, and the momentarily heated air condenses, may be equal to many thousands of tons, and quite sufficient to occasion a sound louder than that which is produced by any artillery. Thunder and lightning occur most frequently at those places and those seasons of the year where the heat is most intense; and a violent thunder-storm usually produces a change of the weather.”*

Such are some of the wondrous works of God. But as it is growing late, and the night air is beginning to be unpleasant, let us, Lorenzo, retire to our dwellings, and there seek, under the protecting hand of Heaven,

* See a modern publication, entitled “A Library for the People,” second divis. p. 100.

"Tir'd nature's sweet restorer, balmy sleep,"

'till the ruddy morning awakes in the eastern sky,
and discloses new scenery to aid our contempla-
tion, and calls us afresh to the delightful theme.

SECTION V.

OF THE EARTH IN GENERAL.

First Division—The Vegetable World.

I read His awful name emblazon'd high,
In golden letters, on th' illumin'd sky;
Nor less the mystic characters I see
Wrought in each flower, inscrib'd on every tree:
In every leaf that trembles to the breeze,
I hear the voice of God among the trees;
In every creature own His forming power,
In each event His providence adore.

BARBAULD.

AT an early hour the next morning, Lorenzo was awakened from his slumbers by the orient beams of the effulgent king of day. It was one of the most delightful mornings that ever peeped from the summer sky. All nature was hushed in profound silence, save when the welcome notes of the early choristers of the grove, or the murmurings of the sweet-flowing stream, broke occasionally upon the ear. It was a time fitted for meditation. As he arose, and cast his eyes towards the eastern scenery on high, he was powerfully reminded of the rapturous couplet of the poet—

“The glory comes! hail to the rising ray!
Great lamp of light, and second source of day!

And hail, SUN of RIGHTEOUSNESS! said he, of whom the natural sun is but a faint emblem. Do thou shine upon us, “with healing in thy wings!”

In a short time, according to agreement, he rejoined his friend Eugenius, whom he found, though at this early hour, waiting his arrival, and occupied in reading his favourite Thomson, towards the beginning of his sublime description of Summer, line 81--90.

Having surveyed, said Lorenzo, “those immense globes that roll above us,” and the phenomena of the airy regions on high, let us now descend to this earth upon which we tread, “which unfolds so many treasures to our view.” We have a large field for observation before us; but, as we have determined to devote the whole day to the pursuit, we may probably explore many hitherto unbeaten tracks, and see fresh instances of the wisdom and power of the great Maker of all things.

I willingly accept your invitation, returned Eugenius; and, as you have committed the task to me, I shall therefore choose my own method of procedure.

Great as unquestionably are the objects which we have been considering, the wonders of the Almighty are not confined to the skies. Behold the beauteous and varied landscape around us! Let us contemplate awhile the charming scene. Thus, as has been observed, we shall find

“Tongues in trees; books in the running brooks;
Sermons in stones; and good in every thing.”

“The constituent parts of the earth are two —

land and water." The water is said to occupy rather less than three-fourths, and the land rather more than one-fourth of the earth's surface.* As I shall speak of the ocean and of rivers in a subsequent part of our discourse, I wave it at present; but before I proceed to describe the other portion of the earth and its inhabitants, it will not be amiss to observe, by way of exalting the great Former of the universe, that though the number of persons on the earth is supposed to exceed eight hundred millions, "it is probable the 'human face divine,' in every instance, varies in some of its features."†

We have, indeed, as you observe, a large field for observation before us: the earth and its productions, including the animal, vegetable, and mineral kingdoms—the ocean and its peculiarities—and whatever else comes under this general branch of our subject. And of all the studies that can engage a serious mind, (the Book of Grace excepted,) the study of the volume of Nature is perhaps the most dignified and interesting. In this delightful employment, though somewhat circumscribed, we are now to be engaged.—

. And let us o'er the fields,
Across the down, or through the shelving wood,
Wind our uncertain way. Let fancy lead;
And be it ours to follow, and admire,
As well we may, the graces infinite
Of Nature. Not a tree,
A plant, a leaf, a blossom, but contains
A folio volume. We may read, and read,
And read again, and still find something new,
Something to please and something to instruct,
Even in the noisome weed.

HURDIS.

* Arts of Life and Society, p. 136.

† Williams's Cottage Bible, vol. iii. p. 555, note.

And though not able to enter into their *minutiæ*, or treat of the wonders of creation, with the wisdom of Solomon, who “spake of trees, from the cedar tree that is in Lebanon even unto the hyssop that springeth out of the wall;” who “spake also of beasts, and of fowl, and of creeping things, and of fishes;” (1 Kings iv. 33;) we may at least attempt to sketch their more prominent features.

And first, of the vegetable kingdom.

Observe the tribes of vegetables in the beauteous scene before us. “These,” says Mr. Locke, “may be divided into three sorts—herbs, shrubs, and trees. In vegetables there are two things chiefly to be considered—their nourishment and propagation. Their nourishment is thus: The small and tender fibres of the roots being spread under ground, imbibe from the moist earth juice fit for their nourishment; this is conveyed by the stalk up into the branches and leaves, through little, and, in some plants, imperceptible tubes, and from thence by the bark returns again to the root: so that there is in vegetables, as well as in animals, a circulation of the vital liquor. Nature has provided for the propagation of the species of plants several ways. The first and general is by seed. Besides this, some plants are raised from any part of the root set in the ground; others by new roots that are propagated from the old ones, as in tulips; and in others, the branches set in the ground will take root and grow; and, last of all, grafting and inoculation, in certain sorts, are known ways of propagation.”*

* Elements of Natural Philosophy, p. 28.

With respect to the propagation and continuance of plants, the author of a work I lately met with,* has carried us a step or two further: and, as it will set forth the wisdom and power of the Creator, in an eminent degree, I shall indulge myself in an extract from the beginning of the first volume, dialogue i. p. 13. "A plant," he observes, "that bears seed, is fixed in the earth, and cannot transfer the seeds to any other place; for this reason Nature, if I may use the expression, has given wings to these seeds, to prevent their falling all in one place. Some burst their shells with great vigour, and scatter themselves over a large extent of land; others are really furnished with little wings, which convey them, by the assistance of the wind, to a great distance; and others, besides this advantage, have small hooks, that, in spite of the wind, fix them to some particular place. The design of the Author of Nature could not have a more evident display. The seeds are entirely abandoned to the wind; from whence we infer, they ought to be scattered up and down; though they are not to take root wherever they fall, but in such places only where they meet with juices proportioned to the smallness of their pores."

This fact, so confirmatory of the superintendence and control of the great Creator—of the matchless wisdom which he displays in the varied works of his hands—and of my position, that chance can produce nothing that is uniform and unvarying, and that nothing can, strictly speak-

* "Spectacle de la Nature, or Nature Displayed," 4 vols. 12mo. translated from the French by Mr. Humphreys: an interesting and instructive publication.

ing, arise spontaneously, no, not even a blade of grass;—I say, this fact, so pleasing to the lover of Nature, is confirmed by the testimony of a respectable writer, in a small pamphlet which has lately made its appearance, under the title of “*Outlines of Botany*.” Speaking of plants, he says,—“That they may never become extinct, the number of their seeds is often immense; Ray counted thirty-two thousand in one poppy-head! Where the seeds are less numerous, their safety is secured by the extra strength of the seed-vessel, their nauseous, poisonous nature, and other means.” He then adds—“The various modes in which they are spread over the face of the country, afford equal evidence of a peculiar providential care. The seed-down bears some through the air to a distance; some cling, by their rough appendages, to the coats of animals; others are borne by neighbouring streams, or by the winds, to an immense distance; cocoa nuts float from the tropics to the shores of Norway; African seeds are blown over the southern coasts of Spain; and birds, animals, and even the seed-vessels themselves, by an ejective power, all perform a part in the office of dissemination.”

The number of plants known to botanists, near one hundred thousand, is surely worth our notice. And when we reflect that they are endued with a certain degree of sensation or life, approaching very near to animal existence, as instanced particularly in the sensitive plant; that roots sometimes change their form to suit the moisture or dryness of the soil in which they grow; when we consider also the variety of seed-vessels, and of

stalks or stems; the curious and interesting anatomy of plants; the phenomena of vegetable life; the food of plants, which, botanists tell us, they search for by means of their roots; or the fact, "that the root is gifted with the power of rejecting what is hurtful, and selecting what is beneficial to its parent plant;"*—I say, whether we consider all or any of these circumstances, it must be blindness indeed not to discover the operations of that Being, whose wisdom and whose power shine so conspicuously in this part of the fair creation. Apart from this recognition, indeed, how just is the inference of the poet—

"What though I trace each herb and flower
That drinks the morning dew—
Did I not own Jehovah's power,
How vain were all I knew!"

In this part of creation, how the eye is charmed with the rich profusion every where so conspicuous! There is something peculiarly pleasant to the eye in the cheerful green which forms a carpet beneath our feet, and in the blue or azure sky. The wisdom of the Creator is here very conspicuous, as the organs of seeing are refreshed rather than injured by the view. "Common experience as well as philosophy tells us," says Dr. Watts, "that bodies of blue and green colours send out such rays of light to our eyes as are least hurtful or offensive; we can endure them longest: whereas the red and yellow, or orange colour, send more uneasy rays in abundance, and give greater confusion and pain to the eye."

* Outlines of Botany, p. 5, 6.

And then, what abundant provision, during many months of the year, is afforded to the animals which are scattered over the lowly valleys, the lofty hills, or the verdant fields, by the produce of vegetation! See too what a rich repast it yields to the various tribes of insects! of which we shall presently treat. Not a plant or a flower but sustains innumerable multitudes of the insect tribe; and not a tree is there but affords a refuge to some portion of the feathered race, which sing among the branches. If we look forward, lo the clustering fruit hangs on the bending branches, and seems to invite us to the pleasing repast! If we gaze still further, herbs of various size and name, and of unparalleled medicinal qualities, present themselves in abundance. On the right and on the left the sense of smell is regaled by the odoriferous flower-gardens, which contain inhabitants of every form and hue, And behind us is the spacious wood —

“That clothes the weary steep, and waves in the breeze
Her sea of leaves. Thither we turn our feet.”

What a comparatively wild and neglected spot is this! Yet here the all-bountiful Disposer of events deigns to visit, and to spread his life-giving, life-sustaining influence around.

“Behold the stately cedar stands,
Rais’d in the forest by his hands!”

Here is the stately oak, so long in coming to perfection, but which, when matured, seems to bid defiance, by its strength, to all opposition. Who that gazes upon it now would suppose that it once was no bigger than an acorn? or rather, that the

acorn was the germe of its future or present greatness? Without the aid of the forest timber, where would be the ponderous and noble vessels that glide along the liquid element? or what would support the more humble places of our abode, or the useful seats of merchandise? The sacred temples too, those dwellings of Jehovah, and the scene of our devotion and praise, would want some of their main props and supporters. And, indeed, in every work of this kind, of the least magnitude, we should be continually put to a nonplus, had not Heaven so graciously provided these abundant aids to our industry and contrivance.

SECTION VI.

OF THE EARTH IN GENERAL.

Second Division—Mountains.

BUT we must quit this pleasant scene, Lorenzo, and go in search of others. The cool, the pleasing streams, we pass by at present; but yonder are the heaven-crowned mountains, to which we will repair. “High and low, elevated or depressed, each corner of the earth affords matter for contemplation; but no theatre is more instructive than the craggy sides of tremendous mountains,” (such as are to be seen abroad,) “which rise in dreadful majesty—and whose venerable brows are charged with eternal ice.” Compared with such as these, the mountains before us appear as the plain, and their height as nothing. The origin of these stupendous masses cannot be ascertained, though their uses may; and the tremendous height and astonishing phenomena of some of them, seem to bid defiance to all conjecture.—Guthrie makes mention of Norway as abounding in huge mountains, and says, from the peculiar

formation and size of some of them, having immense caverns beneath, and reservoirs of water on the top, that they form a most surprising part of the landscape.

Of all mountains, volcanic, or burning ones, seem the most remarkable. Of these there are said to be one hundred and eighty-nine in existence, though many are supposed to be extinct; and it is further stated, that as so much of the earth is yet unexplored, there are probably no fewer than two hundred and fifty!* Of these we have been accustomed to hear most of Mounts Vesuvius and Etna. The circumference of the summit of the former is said to be about three thousand feet; and the height of the latter, eleven thousand feet, or two miles, from the level of the sea.† Besides these, may be named the volcano of Stromboli, one of the isles of Eolus, in the north of Sicily, which has frequent eruptions; Hecla, scarcely habitable by reason of the severe cold, whose top is always covered with snow, and its interior always filled with fire;‡ with a variety of others nearly as wonderful. “Volcanoes are the most awful phenomena known to man. Of their terrific splendour, their deafening noise, their overwhelming torrents of burning lava, and their towering masses of smoke,” we have frequently heard, and stood awhile in silent astonishment; yet “no one can form a just idea who has not seen one; and those who have seen them, find the powers of language inadequate to describe their feelings.”

Among mountains which are not volcanic, but

* Wonders of Nature and Art, p. 72.

† Ibid, p. 59.

‡ Ibid.

which are remarkable for their size and height, may be named the following, as enumerated in the work just referred to.*

REMARKABLE RIDGES OF MOUNTAINS.

The Himalayas, to the north of Hindostan, some of which are from twenty-five to twenty six thousand feet high.

The Andes, in Peru, many of which are twenty to twenty-two thousand feet high.

The Tartarian, sixteen thousand feet.

The Alps, from ten to sixteen thousand feet.

The Pyrenees, from nine to ten thousand feet.

The Norwegian, same height.

The Stony Mountains, in North America, six or seven thousand feet.

The Scottish Mountains, from four to five thousand feet.

The Welsh Mountains, from three to four thousand feet.

SINGLE MOUNTAINS.

Sumatra Peak, sixteen thousand feet.

The Peak of Teneriffe, twelve thousand three hundred feet. And—

Mount Etna, (volcanic,) before named, eleven thousand feet, or two miles high.

“The spectacle,” from these towering heights, “has in it something magical and almost supernatural.” The tops and ascents of many of them are covered with verdure, which affords pasturage for animals which climb these steep precipices, and whose skins are useful to mankind; innumerable springs also come gushing forth, and form sweet-flowing streams in the vales beneath; and in many other respects, these mountains seem well calculated to lead the mind to the “awful God” who presides above all these inferior operations of his hands.

* Wonders of Nature and Art, p. 93.

SECTION VII.

OF THE EARTH IN GENERAL.

Third Division—The Mineral World.

“Nor to the surface of the enliven'd earth,
Graceful with hills, and dales, and leafy woods,
Her liberal tresses, is thy force confin'd:
But to the bowel'd cavern, darting deep,
The mineral kinds confess thy mighty power.”

FROM the foregoing, Lorenzo, at your request, I turn to minerals, or matter dug out of the bowels of the earth. These, according to Mr. Locke, are called by one common name—fossils; comprehending “metals, minerals or half-metals, stones of divers kinds, and sundry bodies that have the texture between earth and stone.”

The Divine Wisdom is particularly discoverable in these secret recesses of the earth; not only by the supplies afforded us, but by choosing this convenient lodgment for them. Were they to be found on the surface of the earth, they would continually be in our way, and be a bar to vegetation;

but the depository in which they are placed is not only removed out of the way of every thing of this kind, but seems, from some considerations which will presently appear, the most suitable that can possibly be imagined.

Among the productions of these lower regions, let us begin with metals. Some of these, such as gold and silver, are very valuable and precious, and very useful also. By means of these, trade and commerce is conducted on a large scale, and labour receives its remuneration; and though dug out of the bowels of the earth, they form splendid ornaments and utensils for the use or embellishment even of royalty. Besides these, art has made them subservient to many other and important services.

But though less valued, and of coarser texture, not less useful perhaps is iron. Without this metal, which grows in such abundance, trade would almost be at a stand, as there are few implements in trade which do not partake of its strength-giving power. Then may be named that useful metal, copper, such large portions of which you have noticed on the exterior of our ships, to prevent the incursions of the waters, as well as to add strength and durability to those ponderous vessels. The domestic circles also confess the use of the latter, as many articles in the household economy are formed of this enduring substance. Next to these, (though less durable, yet extremely useful,) may be named the common white metal, tin, which, under the contriving hand of Art, is used for a variety of purposes. Nor must the soft metal, lead, be overlooked, as without it we should

want a most desirable requisite in building, &c. Last, not least, from some of these, or from a combination of them, are formed those indispensable vehicles of literature and science, the printing-types—by means of whose all-prolific power, the “thoughts that breathe and words that burn,” may be transmitted, at a small expence, from one part of the earth to another, and enlighten, and moralize, and evangelize, where their author never was known!

Thus kind is the Author of Nature in this portion of the works of his hands. Shall we turn from these, Lorenzo, to those hard substances denominated stones, of various hues and texture? Here infinite Wisdom immediately discovers itself. For it is said to be a fact, that those enormous, hard, and heavy stones, so useful in building, when in the quarry from which they are dug, are so soft, that they may be cut out of their beds with comparative ease, though, immediately they are freely exposed to the air, they become extremely hard and durable.—Were they thus hard in their birth-place, it would be next to impossible to raise them from their beds; and were they thus soft when used in our bridges or dwellings, the very circumstance would render them liable to immediate decay, nor could we reckon at all on the safety of those places in which they formed a prominent feature. But is the Atheist wise in referring all this to chance?

In these secret repositories, Lorenzo, as just hinted, are stones of various sorts and hues—some precious, some common, some transparent, some opaque—and they are valued according to their

lustre, colour, smoothness, or weight. Here is the precious diamond, the hardest and most beautiful of stones; here is the ruby, and the garnet, and the hyacinth, and the amethyst, and the emerald, and the beryl, and the sapphire, and the topaz, and the cornelian, and the onyx, and the agate, and the jasper. Here also are stones of a common order or race, but useful in rearing statues, building public edifices, constructing monuments for the dead, spanning rivers, paving our streets, &c. Here too are marbles, and alabasters, and flints, and crystals, and slates; all formed so imitably by the fostering hand of Heaven, and so useful in their kind, under the metamorphosing power of the Arts and Sciences.

We pass from these to a most invaluable fossil used in firing—I mean coal. Here are prodigious storehouses and inexhaustible mines of this useful article, of various qualities and richness, and adapted to the various purposes of the arts of life and society. And it is probably owing to the smoke emitted from these when kindled into a flame, that, in large cities, we are preserved from the devastating plague. In the domestic economy, as well as in the multifarious concerns of trade, we should often want a most important article, were we destitute of this useful fossil. Among fossils too we must not omit to mention the several sorts of “ochre, chalk, that which they call black lead, and other bodies of this kind, which are harder than earth, but have not the consistency and hardness of perfect stone. Besides these there are found in the earth several sorts of salts, as eating or common salt, vitriol

salt, gemma, and others. The semi (or half) metals that are dug out of the bowels of the earth are antimony, cinnabar, zinc, &c. to which may be added brimstone." The mineral kingdom is also of use in a medicinal point of view. And, in conclusion, upon the authority of your favourite Locke—"All stones, metals, and minerals, are real vegetables; that is, grow organically from proper seeds, as well as plants."*

* Elements, p 27.

SECTION VIII.

OF THE EARTH IN GENERAL.

Fourth Division—The World of Waters.

“ From flowers and meads, and woods and shades, we change,
And for a while we'll on the Ocean range;
The wonders of the deep we'll now explore,” &c.

HAVING thus surveyed the surface of the earth, and made an excursion into some of her secret recesses, I now propose, Lorenzo, previous to looking into the animal creation, to bestow some consideration on the great world of waters, comprehending springs, rivers, and the ocean.

On this subject, as I know he is a favourite, I shall begin by reading a quotation from Mr. Locke, contained in p. 22 of his Elements, before referred to. “ Part of the water that falls down from the clouds, runs away upon the surface of the earth into channels, which convey it to the sea; and part of it is imbibed in the spongy shell of the earth, from whence sinking lower by degrees, it falls down into subterranean channels,

and so under ground passes into the sea; or else, meeting with beds of rock or clay, it is hindered from sinking lower, and so breaks out in springs, which are most commonly in the sides, or at the bottom of hilly ground. Springs make little rivulets—those uniting make brooks—and those coming together make rivers, which empty themselves into the sea.”

Of the various uses of rivers I need not here enlarge. Besides adorning the scenery, they afford drink to man and beast, fertilize and refresh the lands through which they pass, and aid, in an extraordinary manner, the commerce of the world. When we reflect upon their number, and the enormous size of some of them, in some instances—

“Rolling with wealthy pride o'er sands of gold,”

and extending for hundreds of miles, we are utterly at a loss to conceive of any source (except the great Source of all things) capable of supplying their ever-rolling streams. “What source,” says one, with evident amazement, “is sufficient to feed such a river as the Rhone? What storehouses large enough to supply the mighty cisterns of the Danube, the Ganges, or the River of the Amazons, (in America?) Where are those immense, invisible reservoirs, which, through so many hidden channels, pour forth such inexhaustible treasures of water, filling the vast bosoms of the rivers with a profusion abundantly sufficient for all our wants, and yet restrained within such proper bounds, as not to overflow instead of enriching the countries through which they pass?”

And then, Lorenzo, the Ocean—what a mighty storehouse is there! As before hinted, nearly three-fourths of the earth, we are told, is covered with *water*, and only little more than one-fourth is land! The ocean, says Guthrie, is a great and spacious collection of water, without any entire separation of its parts by land. There are three extensive oceans, (besides lesser seas, which are only branches of these,)—namely, the Atlantic, the Pacific, and the Indian Ocean. The Atlantic or Western Ocean, which divides the eastern and western continents, is three thousand miles wide; the Pacific divides America from Asia, and is ten thousand miles across; and the Indian Ocean, which lies between the East Indies and Africa, is three thousand miles wide!*

Here are things creeping innumerable! There go the ships, those mighty aids to Commerce; and thousands and thousands of riches are derived from the important traffic. There go the missionaries, to teach the arts of peace; to beat the swords into ploughshares, and the spears into pruning-hooks! Yonder comes a vast store of provisions in the form of fishes, of which I shall presently treat. And it is worth while to remark for a moment, as it evinces the Divine Wisdom, that of those fishes which are beneficial for food or otherwise, we have an abundant and wonderful increase; while those monsters of the deep which terrify or annoy us, are found to breed remarkably slow.

The sea indeed is a wonderful repository; and,

* Guthrie's Geograph. Gram. Svo. introduc. vol. i. p. 40.

from good authority, we learn, that it is at least two miles in depth. I know not whether we are warranted in adopting the idea of the author of the *Spectacle de la Nature*, who says we are justified in concluding that the bottom of the sea is covered with plants like the land, but of quite a different nature; that it has its forests and meadows, wherein the inhabitants of the waters find such food as is convenient for them; and though not of *immediate* use to us, yet that our benefit was the end of their creation, since he supposes they serve for the nourishment, retreat, or defence of such fishes, tortoises, and shell-fish, as supply our tables both with plenty and dainties. Whether this hypothesis be founded in reason or not, we know that there are some sorts of plants in the sea. Sponge, which is very soft, is one of these; and coral, which is entirely stony, and grows on rocks in the sea, and is attainable by a curious kind of fishery, is another. The history of the latter is very interesting. We are told that it is always within of a stony, solid, and very hard nature, even when in the water, except the extremities of branches, which afterwards grow hard, and petrify in the air. The bark or rind is a little rough and jagged, but takes a very fine polish. One observer of their *minutiæ* affirms, that on the sides of some young branches of coral he found little tumours or excrescences, pinked in the form of stars; and from within he saw flowers shooting forth, which withdrew again into them upon the coral's being exposed for a time to the open air.*

* *Spectacle de la Nature*, vol. iii.

This, Lorenzo, is offered as a small part of the wonders of the mighty deep. Perhaps we never see the power of God more fully displayed, than in those storms which agitate the troubled ocean, and the succeeding calm. This I have elsewhere described, and, as such, shall here partially retrace the scene. At a distance before me roll the billows of the mighty ocean, covering in its deep a world of wonders. There the awful God is seen to ride forth in terrible majesty, and to proclaim his superiority to all that is created. I see a storm arise. The heavens frown upon the deep—the storehouses send forth the impetuous shower.—Armed with more than mortal strength, the angry winds bellow in rage—the thunders are heard—the lightnings play upon the deep—Ocean is convulsed, and heaves his sighs in awful grandeur!—while the terrified mariners shriek in agony as the vessel alternately is tossed to the height of the mountains or sunk again to the deep! But see! as if to shew the same powerful God, how perfect is the calm! The elements cease their contention—the billows retire to their accustomed bounds—the foaming surges forget their fury—the lacerated vessel again cuts the tranquil deep—and the affrighted mariners once more are safe from the impending danger.

But I must not here enlarge. The last thing that I mention under this head is that motion of the water called tides, which is a rising and falling of the waters of the sea, and is caused by the attraction of the moon. Here is a fresh instance of the Divine power and goodness. Were the ocean to sleep in profound silence, or become stag-

nant, it would be an intolerable burden to the land, and become the cause of destruction to all around; but by means of the salutary influence of the tides, the waters are purged of their filth, and become an invaluable blessing instead of a curse, by nourishing the animals that reside therein, and being serviceable in a variety of other ways.

But this brings us to the tribes which inhabit the watery realms; of which, and the rest of the animal creation, in a future conference.

SECTION IX.

OF THE ANIMAL WORLD.

First Division—Fishes.

WE have now arrived at a new and an interesting part of our subject—the animal creation in general. Man and brute, says Locke, divide all the animals of this our globe. We shall commence with the latter, reserving the former for the sequel of our discourse. “Brutes,” continues Mr. L. “may be considered as either aërial, terrestrial, aquatic, or amphibious. I call those aërial which have wings, wherewith they can support themselves in the air. Terrestrial are those whose only place of rest is upon the earth. Aquatic are those whose constant abode is upon the water. Those are called amphibious which live freely in the air upon the earth, and yet are observed to live long in the water, as if they were natural inhabitants of that element.”

Having just considered the other wonders appertaining to the boundless main, it seems natural that we should next consider the inhabitants there-

of, whether truly aquatic, or of the amphibious kind. We can afterwards turn to terrestrial and aërial animals, which are equally deserving of attention.

It is pleasing to observe how Providence adapts every creature to the situation in which it is destined to move. "Fishes, like other animals, are admirably fitted for their situation. Their bodies are finely made for cutting and gliding through the waters, and their fins give them as much the command of the sea as wings give fowls that of the air. They are all covered with a glutinous matter, that defends them from the immediate contact of the surrounding fluid. Their sensations are not so perfect as those of terrestrial animals, only because not so necessary. Their rapacity, though insatiable, is connected with a faculty of sustaining hunger to a length of time totally incredible Their astonishing longevity seems one of their chief characteristics. Indeed they appear to have no limits either to their age or their size. And yet their fecundity is still more wonderful and extraordinary. Some multiply by hundreds, some by thousands, and others by millions."

The last-mentioned fact relative to the fecundity of fishes, is particularly evident in the case of herrings. They are known to set out from the northern icy sea about the middle of winter, in such incredible numbers, that if all the men in the world, says my author, were to be loaded with them, they could not carry the thousandth part away! But they are soon thinned by the millions of enemies that waylay them in their course. The

immense swarm, however, which escapes the ravages of their enemies, gives a new appearance to the ocean. It is, says the above author, divided into distinct columns of five or six miles in length, and three or four in breadth, while the water before them curls up, as if forced out of its bed. Under these circumstances they are easily caught, in some instances above two thousand barrels at a draught. It is said they breed so fast, that a single herring, in twenty years, if unmolested, would produce a family ten times as numerous as all the tribes which animate our earth; but the balance of nature is so managed, by unerring Wisdom, that their consumption keeps pace with their increase. Otherwise, "the sea would soon become overcharged with the burden of its own productions; and that element, which at present distributes health and plenty to the shore, would suffocate and load it with putrefaction."*

I think, Eugenius, said Lorenzo, the cod-fish is equally (if not more) celebrated for its fecundity.

One of those, resumed the former, incredible as it may appear, is said to produce at least as many of its kind in one season, as there are persons in England. But as it is a fish so well known, I shall not dwell upon its history, but proceed to the fire-flare, a phenomenon of the ocean, which appears to be dreaded even by experienced fishermen, on account of its being furnished by nature with a forked weapon, which grows from the tail, and is five inches long. The ancients assert it to

* Beauties of Natural History, p. 311, to which I am indebted for some interesting particulars.

be of a venomous nature, and many philosophers and fishermen, it seems, concur in the same opinion. Not very dissimilar in reference to self-defence, is the rough-ray, which, though it appears harmless, is covered with prickles which it puts forth at pleasure, to the great discomfiture of those who attempt to take it in their hands, unless they should happen to seize it by the little fin at the end of the tail, where there are none of those prickles. The peculiar habit of this fish is, the choosing those parts of the sea which have a black muddy bottom, where it devours every thing with which it comes in contact, that is not able to resist its superior power. But one more wonderful than either of these, perhaps, is the torpedo. The instant this fish is touched, "it numbs not only the hand and arm, but sometimes also the whole body. The shock received, by all accounts, most resembles the stroke of an electrical machine—sudden, tingling, and painful. And that it proceeds from a certain kind of animal electricity, which the creature has some hidden power of starting up, is perhaps the most plausible account that has yet been given of the phenomenon."* Beyond this, there is nothing very extraordinary, either in its nature or in its general aspect.

The sun-fish is worthy of notice. These are of a large size, and one taken near Plymouth, it seems, was about five hundred weight. They have a very small mouth, and each jaw contains two broad teeth, with sharp edges. The back is dusky and dappled—the belly of a silvery white.

* Beauties, p. 309.

Among testaceous animals, (or those which have shells,) which inhabit the mighty waters, there are two which claim our notice: and, although they are so common among us, I feel persuaded that their history is by no means uninteresting. The first of these is the muscle. This little creature, as is well known, “consists of two equal shells, joined at the back by a strong muscular ligament, which answers all the purposes of an hinge. By the elastic contraction of these, it can open its shells at pleasure, about a quarter of an inch from each other. The fish is fixed to either shell by four tendons, by means of which it shuts them close, and keeps its body from being crushed by any shock against the walls of its own habitation.” Their fecundity is astonishing: it is said that “a single muscle, *if there were not another in the world*, would soon replenish the ocean!” although their enemies, it appears, are numerous and rapacious. But that from which they suffer most, is the agitation of the waters. For this reason nature has provided them with threads or strings, which are of a glutinous nature, and which they are enabled to fix to the rocks, or any other mooring, and thus arrive at that fixation which is so necessary, in order to their enjoying the aliment all around them. The tongue of the muscle too, according to the “Spectacle de la Nature,” performs the office of a foot, and enables her, when necessary, to move onward. It is said she can extend it full an inch and a half out of the shell.

The other above alluded to is the oyster. This creature also considers fixation as necessary to its well-being. For this purpose it is in possession of

a kind of glue, which it fastens to rocks, seaweeds, or stones, at the bottom of the waters; and which, when cemented, "is as hard as the shell, and not less difficult to break. The shell, however, is sometimes furnished with a beard, not a little similar to that of a muscle, which answers the same purpose. They cast their spawn in May, which at first appear like drops of candle grease, and stick to any substance they fall on. These are covered with a shell in two or three days, and in three years the animal is large enough to be brought to the market." These are the common oysters. But rock oysters, which adhere to rocks at the bottom of the sea, are sometimes found full as broad as an ordinary plate; and "the largest of all are those of the East Indies, some of whose shells are two feet over." The pearls which are found in some oysters, and from which it is said the mother-of-pearl is taken, form a variety of useful articles. These pearls are sometimes seen "adhering to the shell, sometimes making a print in the body of it, and sometimes at large within the substance of the fish."* As if to silence the cavilling sceptic, oysters (although so numerous and regular in their season) are produced in the same manner as muscles. So wonderful, so mysterious, so varied, so powerful, are the operations of the Divine Hand!

But I must pass by hastily the curious flying fish, which, when narrowly pursued, makes its exit from the water into the air; the wonderful sea unicorn, or narwhal, which is sixty feet in

* Beauties of Natural History, p. 326.

length, and has an enormous pointed tooth, “from nine to fourteen feet long, as straight as an arrow, about the thickness of the small of one’s leg, wreathed in a manner we sometimes see twisted bars of iron, and is whiter, heavier, and harder than ivory;” also the huge dolphin, (so celebrated by the ancients,) whose scales, all over its body, “are of a bright, beautiful, silver colour, and, when it rises from the sea, sparkle in the sun like a cluster of diamonds;” the large grampus, which exceeds twenty feet in length, and is proportionably thick; and the voracious porpus, (not quite so large as the latter,) the determined enemy of fish of passage, such as the herring, the mackarel, the salmon, and others, which it fiercely pursues and devours, in the season when they make their appearance. I must pass by these thus briefly, in order to hasten to one or two monsters of the deep, long celebrated in natural history, with a description of which I must bring this branch of our subject to a conclusion.

The first of these is the formidable shark, which “joins to the most amazing rapidity the strongest appetite for mischief. His strength is enormous—his celerity is unparalleled. He is found from twenty to thirty feet long; the head is of a monstrous size, and somewhat flatted, and the mouth of a terrible width. So wide is his throat, that he can swallow a man with ease! He has six rows of teeth—hard, sharply-pointed, and of a wedge-like figure: there are said to be seventy-two in each jaw, which make the fearful number of one hundred and forty-four in the whole! He has the power of erecting and depressing them at

pleasure. When he is at rest, they lie quite flat in his mouth; but when his prey is to be seized, they are instantly erected, by means of a set of muscles that join them to the jaw." To these outlines may be added "his fins, large and bristly, agitated like the mane of a lion; his great goggling eyes, rolling furiously on every side to see his prey, as well behind as before." His skin is hard, rough, and prickly, and is used for covering instrument cases; his bones are gristly; and his whole appearance is fierce and savage in the extreme.

So much for the shark, that prodigy of creating power: and now, "last not least," comes that still more wonderful creature, the enormous whale. Of this a great deal might be advantageously said, but I must draw my remarks into a small compass.

Whales are seen in some seas above an hundred and sixty feet long; but the Greenland whale, which is from sixty to seventy, is the one with which we are most intimately acquainted. The head is of a monstrous size; the fins on either side are from five to eight feet, and so strong as to give facility to the movements of the enormous creature, when activity is its object; the tail is about twenty-four feet broad, and prodigiously strong; "the skin smooth and black, and in some places marked with white and yellow, which, running over the surface, has a very beautiful effect." Its eyes are not larger than those of an ox, and its sense of hearing is wonderfully quick and powerful. Its outward covering is not thicker than parchment; but beneath this is another, full an

inch thick, under which is found the fat or blubber, which, when the animal is in a healthy state, is of a yellow cast, and from eight to twelve inches deep. This fat or blubber turns to oil; and every whale is computed to yield between sixty and a hundred barrels of oil. The bones of its body are of no use, being as hard as an ox's; but the tongue, which is about eighteen feet long, is inclosed in long pieces of the substance we denominate whalebone: on each side of the tongue, however incredible it may appear, there are about two hundred and fifty pieces of this hard substance!

Such are some of the wonders pertaining to this huge creature. And the dangers arising from his depredations, &c. are so well known, that I think it unnecessary to say any thing further concerning his eventful history.

Those amphibious animals, the crocodile and the sea-horse, not properly belonging to the head—"Fishes," will come in for a share of attention in Section xii. under the denomination of "The Savage or Untamed Tribes."

Here closes our investigation of that world of wonders, the sea, and its numerous and interesting tribes. And although much is left unsaid that would aid our cause, for want of time and opportunity, yet sufficient surely has been advanced to lead the mind to the Great First Cause of all things; whose power is so wonderfully displayed in this portion of the works of His hands.

SECTION X.

OF THE ANIMAL WORLD.

Second Division—Insects.

OUR first excursion, Eugenius, said Lorenzo, in the animal creation, has proved to me highly interesting and amusing. And having surveyed the watery realms and the phenomena of the deep, we are naturally led to the creatures which inhabit the land—the cattle upon a thousand hills—the savage tribes—the insects that crawl upon the earth or flit in the air—as well as that interesting portion of animated nature, the feathered race of songsters, which enliven and render vocal the grove—and their kindred, of sprightly plumage or domestic use, that hold their residence on the land.

As you are by far my senior, and your method has hitherto been pleasing, I shall leave the description to yourself.

Eugenius then resumed the investigation thus.—I want but little invitation, Lorenzo, on this delightful theme. “The view of nature enchants me,

and I find new pleasure in it every day, even with respect to the minutest objects. Let us first consider the smallest objects—we may afterwards ascend by degrees. Let us begin with these insects, so much despised by others, but of which you are so fond. If the Deity did not consider it unworthy of himself to create them, is it beneath us to consider them? Their minuteness seems, at first sight, to justify the contempt we entertain of them; but, in reality, it affords us fresh reason to admire the art and mechanism of their structure, which associates so many vessels, fluids, and movements, in a point that is frequently imperceptible. Vulgar prejudice considers them as the effect of chance, or the refuse of nature; but an attentive eye discovers in them a Wisdom which, far from neglecting them, has been particularly careful to clothe, arm, and accommodate them, with all the instruments necessary to their condition.”*

This is indeed a most interesting portion of the animated world. For, whether we advert to the beauties of their clothing—arms, offensive and defensive—organs, and implements for working—origin, and first state—intermediate, and last or final state, a resurrection to newness of life;—their food, its wonderful variety, peculiarity, and abun-

* While on this part of the subject, it may not be amiss to observe, that there are animalcules so small, that, “reckoning sixty drops to a dram, there would be a number in a gallon of water exceeding by one half the amount of the population of the whole terraqueous globe! How inconceivably minute must the vessels, organs, and fluids of these animals be! The diameter of several of these animalcules does not exceed the four-thousandth part of an inch. A whale requires a sea to sport in: a hundred and fifty millions of these would have ample scope for their evolutions in a tumbler of water!”

dance—their rings, by contracting or dilating which they are enabled to move forward or backward—their number, and variety of species, (silkworms and caterpillars exceeding three hundred,)—manner of working, uses, produce, and forecast—their industry, as instanced in the toiling ants and bees—promptness with which they assist their species—their houses, streets, and kingdoms—the curious manner in which some of them build their sepulchres or tombs, in which they remain in a torpid state till the time for their transformation or metamorphosis appears;—I say, whether we advert to all or any of these, so beautifully detailed in the *Spectacle de la Nature*, before adverted to, we evidently perceive the superintendency of a Being whom we denominate God, who regulates, with such scrupulous exactness, their varied movements;—

..... "Whose hand unseen
Moves and guides the vast machine;"

a superintendency as much superior to that of an earthly kind as the most finished piece of mechanism is to disorder and confusion: and which plainly declares that all things—even the minutest and most insignificant, as well as the most important—owe their origin and continuance to HIM, the Great First Cause of all things—the Creator of animate and inanimate nature;—in whom we "live, move, and have our being!"

But to proceed at once to the subject before us.

An insect is a small creeping or flying animal. "Every insect, whether it flies or creeps, is composed either of several rings, which shrink from

or approach one another in a common membrane that connects them; or else of several distinct scales, that slide over one another; or lastly, of two or three principal parts, connected by a thread they call a ligature. It should seem that the term *insect*, which is appropriated to all these separate parts, sections, and moving rings, is derived from a Latin word, which signifies *to cut*, and is applied in general to all these little creatures."

There are several thousand species of insects, and almost every species, unlike other animals, has its peculiarities, in reference to origin and manner of subsisting, as well as the changes which are undergone during their short earthly existence. Indeed, the varieties here discernible almost baffle the powers of description. I hold in my hand nine closely-written folio manuscript pages, which merely contain a *selection* of the wonders appertaining to the insect tribe, and which I had sketched in anticipation of the subject; but brief as is this apparent lengthened detail, I find I must forego the pleasure of reading it, and submit (what will better accord with the time we allotted ourselves) some general remarks upon the whole.

In all the works of man, however beautiful, a close investigation discovers some imperfection; but in the works of the all-wise Creator, even with respect to the most unsightly creatures, there is a perfection and a beauty which mark them as Divine.

"In the *interior* parts you will always find a freedom, a plainness, and a set of springs, whose art, structure, and correspondence, are known by Him alone. In the *exterior*, the finest touches of the

pencil, with magnificent symmetry and amiable graces, diffused through the whole. Observe the head of a common fly in a magnifying glass. One can never be satiated with surveying such a profusion of gold and pearls on a head so inconsiderable. Solomon, in all his glory, was not arrayed like one of these!"*

Are not insects, Eugenius, divided into different classes?

Yes, they are sometimes divided into four classes. Among insects of the *first class* (which have no wings) may be ranked the following. And however offensive these may be, their history is by no means uninteresting.—

1. The Spider.
2. The Flea.

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3. The Scorpion.
4. The Leech.

Of that offensive little creature, the flea, it is particularly remarked, that it “will draw a chain a hundred times heavier than itself; and to compensate for this force, will eat ten times its own size of provisions in a single day!”† Its appearance too, when seen through a microscope, is by no means uninteresting. I myself remember seeing one through a glass of this kind; and it certainly appeared, with its chain of gold about it, no very contemptible object. The body seems all over curiously adorned with a polished sable armour, neatly jointed, and beset with multitudes of sharp pins, very similar to the quills of a porcupine. It has *six* legs, which it can dilate or contract at

* Spectacle de la Nature, vol. I. p. 7. † Beauties, p. 121.

pleasure; and the dexterity with which it employs them is equally wonderful and amazing.*

I must pass by the *minutiæ* of the spider, though every way interesting, and that of the scorpion, which, in some parts of the East, is found full as large as a lobster, and whose sting is of so fatal a nature—as well as that of the leech, with whose nature we are more familiar.

Insects continued.

The *second class* of insects have two wings, which furnish them with many advantages over the tribe above mentioned. Among these are included—

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|---------------------|---|------------------------|
| 1. The Dragon Fly. | ∖ | 6. The Earwig. |
| 2. The Ant Lion. | ∖ | 7. The Froth Worm. |
| 3. The Grasshopper. | ∖ | 8. The Water Fly. |
| 4. The Locust. | ∖ | 9. The Water Scorpion. |
| 5. The Cricket. | ∖ | 10. The Ephemera. |

These are “produced from eggs, like some of the former, but not in a perfect state; for when first excluded, they are totally without wings.” After a time, however, they are “seen to assume two wings, which, like a budding flower, burst through the case that contained them, and they become at once complete winged insects.”†

The history of each of these would furnish us with useful matter for reflection, and well employ

* Beauties of Natural History, p. 125.

† Ibid p. 131.

the powers of the mind. It may, however, be briefly remarked, that the dragon fly is a numerous race, and their birth-place the waters. The prominent features of their history are the same. The metamorphosis they undergo, from their first state till they become winged inhabitants of the air, is truly wonderful. Their two eyes are said to resemble glittering mother of pearl; they have four expansive silver-coloured wings; and they have a very long body, which, like a rudder, directs their varied motions.*

The ant lion, in its finished state, very much resembles the latter, but differs from this in many respects in its reptile state. With the little grasshopper we are most of us familiar. It is (with some slight exceptions) of a green colour, and breeds plentifully in the meadows, where it che-rups away its hours during the summer. Its head is said to be like that of a horse, its mouth filled with crooked teeth, and its tongue of a reddish cast, fixed to the lower jaw. It has six legs, four wings, and undergoes, at a certain period, a transformation peculiar to its kind.

Of the formidable locust we have read much in the sacred pages, and are happy if we only know it theoretically. It is about three inches long, and its appearance, when narrowly surveyed, is very beautiful. It abounds in warm climates; and whenever it comes with a large company threatens destruction to the fruits of the earth. Of the cricket and the earwig, whose names are so familiar to us, I must say nothing, though not unworthy

* Beauties of Natural History, p. 121.

our notice. The froth worm “lies hid in that frothy matter which we find on the blades and flowers of plants. Its colour, shape, and size, are all sufficiently known to the school-boy.” In the water fly we find an admirable adaptation to its situation and wants, which sufficiently evidences the wisdom of the Deity. It swims upon its back instead of its belly, and is thus enabled to procure its food with ease, as it feeds on the under side of plants which grow on the surface of the water. The water scorpion is about an inch in length, and is to be found in ponds. It is said to be a very rapacious animal. Lastly, the ephemera, “in its fly state, is a very beautiful winged insect.” It has four wings and a long body, and, before it acquires all its beauties, undergoes a variety of changes. Much more I have at hand respecting these interesting creatures; but I must forbear, and proceed to the

Third class of the insect tribe, which comprises—

1. The Caterpillar.
2. The Butterfly.

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3. The Moth.
4. The Silk-worm.

“Caterpillars are distinguished from the worm tribe by the number of their feet—and butterflies by the beauty and opaque nature of their wings from beetles.” Caterpillars, it seems, are produced from the eggs of butterflies. Their kinds, like their numbers, are truly astonishing, for we are told that every vegetable has its peculiar tribe. During the first formation of this little creature, its life is a scene of transformation from one skin

and colour to another. At length it throws aside its reptile state, and assumes an appearance altogether different from any of the former, which is extremely beautiful.

The butterfly is but the caterpillar in its perfect and matured state. What a transformation! Of these it is said there are upwards of seven hundred different kinds! Their wings are a mark of distinction from all other flies. They have four wings, of a transparent substance; and if at any time deprived of two of them, the order of Providence is such, they can fly with those remaining. Moths, which I mention next, the third in this list, are a kind of nocturnal butterflies. They not only flutter among the flowers by day, but, it is asserted, they gambol in the night in numerous tribes, and expand, at that season, the most enchanting colours. They only differ from the butterfly in some trifling particulars.

The silk-worm is a large whitish caterpillar, or maggot, having twelve feet, and producing a butterfly of the moth kind. We are under numerous obligations to the silk-worm, for its "soft, shining, exquisitely fine silken threads." The wonderful preparation it makes (in common with all the caterpillar kind) for assuming its last and most perfect state, constitutes, we are told, that fine and delicate stuff, to which the exterior of fashionable life owes so many obligations. Its own-made sepulchre; its manner of secluding itself therein for a season; its issuing therefrom, throwing aside its shroud, awaking from its torpor, assuming a form entirely new, adorned in sumptuous array, and becoming, from a creeping insect, a winged

inhabitant of the air; are every way interesting, and worthy of our attentive regard.

Insects continued.

But I must hasten to the *fourth class* of insects, denominated grubs. The names of these follow.—

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| 1. The Bees. | \ | 7. The Glow-Worm. |
| 2. The Wasp. | \\ | 8. The Kermes. |
| 3. The Hornet. | \\\ | 9. The Cochineal. |
| 4. The Ichneumon Fly. | \\ | 10. The Gall Insects. |
| 5. The Ants. | \\ | 11. The Gnats. |
| 6. The Beetle. | \ | |

These, like the former insects, undergo great transformations, and from maggots become winged animals. The difference, however, in many respects, is considerable. The grub has fewer feet than the caterpillar, and, when set at liberty, “its wings are either cased or transparent; not coloured with that beautiful painted dust which adorns the wings of butterflies.” And if I should only glance at many of the insects included in the above list, (which is unavoidably the case, for want of time to pursue the enquiry,) it is, not because any are unworthy of our attention, but because others are deserving of a more minute detail.

To begin then with the proverbially-industrious bees. And, of all insects, these are perhaps the most interesting. They fly from flower to flower, extracting the sweets, and then return home, to

deposit them in the hives. The cells are formed of wax, and their manner of working is worthy of attention. When they commence working, they divide into four parties. One provides materials; another is seen in the bottom and partition of the cells; a third is engaged in smoothing the inside from corners and angles; a fourth in relieving those who return with burdens, and in bringing food for the rest. Their cells, when finished, are perfect curiosities; and the builders appear to be artificers in miniature. Their manner of rearing their young, with such admirable tenderness and care, evinces the same superintending Power and Wisdom before so conspicuous. Indeed, their whole history is highly interesting. And if, in their various movements, they are directed by chance alone, it is chance of an uncommon and unprecedented order.

Passing by hastily the well-known wasp, whose cell is as curious as that of the bee; the stinging hornet, about twice as large as the wasp; and the ichneumon fly, whose course is marked by slaughter; the next on our list are the sagacious and foresighted ants. These little creatures are known to most of us; yet, there are some parts of their history which claim our especial notice. The manner in which they lay up in store for the future, evinces a foresight not to be expected in any but the rational creation. If any thing useful is found which is too heavy for one to bear, and cannot be divided, several are seen to unite in endeavouring to force it along, some dragging and others pushing it. When a fortunate discovery is made, the whole republic is instantly in motion, anxious,

in a collective capacity, to secure the prize. I remember an instance of a little ant having been observed to climb a steep ascent, with a bit of corn in its possession, fifty-nine times, and as often to fall down again; but such was the perseverance and industry of the little creature, that it made an attempt the sixtieth time, and succeeded. From this circumstance I learned, says the observer of it, never to despair in reference to the attainment of any object within the compass of reason: and he attributed much of his success in life to this useful event.

The uncommon and assiduous attention which the ants pay to their young, is extremely interesting and pleasing. They generally raise their hills near a tree and a stream, for this obvious reason, that one may afford them water and the other food. A pyramid is the form of their structure, which is said to be composed of various leaves, chips of wood, sand and earth, bits of gum, and grains of corn. In these habitations are various winding ways, through which they pass and re-pass to the water and the tree, with great parade and expedition.

The tropic ants differ from those of Europe in their manner of laying up provisions, and their superior dexterity in building, and are said to be, in every way, a much more formidable race. Many travellers tell us that their sting produces insupportable pain.

Beetles, which next present themselves, are of various kinds, and are defended from external injury by the cases to their wings. They originate from eggs, and after undergoing some transfor-

mations, break forth with wings in full maturity. The dark beetle "is of a reddish brown colour, sprinkled with a whitish dust," and makes a strange buzzing with its wings. The tumble dung beetle is a native of America; it is not much larger than our common one, but extremely strong. Its breast is covered with a shield of crimson, which shines like metal; its head is red, mixed with green; and a shining black horn is seen on the crown of its head, reclining backwards.

The glow-worm must not pass unheeded. The male has cases to his wings, and can mount the air at pleasure, but the female, we are told, is destined to a reptile state for life. Her charms, however, are of a peculiar nature. She possesses the power of assuming a luminous appearance in the darkest situations.

The kermes are produced in the oak. They are only met with in warm climates, where they run about the branches and leaves of trees. The cochineal is known in America and Mexico. Those in the latter place are of an ash colour, about the size of a small pea, of an oval form, with six feet, and a large snout. Their usefulness is acknowledged in dyeing and medicine. Gall insects, the next on our list, are known in Asia as proceeding from bodies which adhere to a kind of oak. They finally leave their reptile state, creep from the gall-nut, which had long been their dwelling, and change their existence into that of a fly. Gnats, in the last place, are a numerous and a well-known race, and proceed from little worms, generally discovered at the bottom of standing waters. The eggs are laid on the surface of the water, sur-

rounded with an unctuous substance, which prevents their sinking, and they are secured by a thread to the bottom, to prevent the wind carrying them away. The gnats at first are amphibious, but afterwards become winged insects. Their forms are worth investigating, and their numbers infinite.

Insects concluded.

Protracted as is the foregoing account beyond what I intended, I must yet beg your attention, Lorenzo, for a few moments, while I hasten to some particulars by way of conclusion.

“The common opinion that insects rise from putrefaction, is,” says the author of the *Spectacle de la Nature*, “injurious to the Creator, and dishonourable to our own reason. For if we bestow the least attention on these minute animals, who are formed with so much symmetry and art—we must either confess them to be the production of Almighty Wisdom or the offspring of chance. Now, ’tis the last absurdity to ascribe agency to *chance*—nor is it at all better to say, that chance acts with any design, precaution, or uniformity. The same Wisdom, therefore, that appears so admirable in the structure of the human body, is as visible in the composition of an insect; and corruption is no more the parent of these than it is of other animals, or even of men themselves.” How, then, is it, it may be demanded, that insects are always to be found in these corrupt lodgments?

To this our author answers, “ Because other insects have deposited their eggs there. The parents can fly, and find out convenient lodgments for them. All nature is full of animals, some fixed to one kind of nourishment, others to a different: all have their eyes attentive on their prey, and nothing eludes their penetration. They are attracted by the odour, which exhales to a great distance: nay, this very odour was appointed to act upon them by such an attraction. And, therefore, if you always see insects in a body as soon as it begins to corrupt, it is, not because these animals are engendered by putrefaction, but only because they have mothers who know that impaired and corrupt bodies afford the properest nourishment for their young. And this choice of the parent to lay her eggs in a place that abounds with convenient nourishment for her young, demonstrates that corruption cannot engender any being—that chance has no agency—and that it is only Nature (or, rather, Nature’s God) who prescribes to every animal its place, its functions, and its food.”

SECTION XI.

OF THE ANIMAL WORLD.

Third Division—Quadrupeds.

WE have hitherto gone but a little way in our investigation of the animal creation. When we began our survey of the insect tribes, I was determined to use great brevity of speech; but the time stole so insensibly and agreeably away, that I was surprised at the rapidity of its flight, and yet hardly knew how, on a theme so prolific, to check the excursions we were taking. I must now hasten to our enquiries respecting the animal creation in general, without pretending to bestow much time on any particular species.

Who can fail to admire the Power and Wisdom so conspicuous in the animal creation? “Such as share our friendship lend all their assistance in keeping other, and more hostile tribes, at defiance. Some of them afford us the most nourishing food, and enrich our persons with the finest clothing; and we may be said to live entirely either by their industry or on their flesh. By others we transport

ourselves from place to place without labour, and frequently repair our health without medicine. Even those who continue to dispute our superiority, take shelter in the most solitary recesses of nature," and, in some way or other, are made subservient to our good.

Let us push our enquiries a little further on this interesting subject, putting aside that class which has already been under our notice.

Among the animals denominated *quadrupeds*, (or four-footed,) and which are divided into various sections, there are a variety which would yield us much satisfaction. What a merciful provision do we find in the continued and uninterrupted succession of that noble creature, the horse, the source of so many enjoyments to the animal man ! His majestic appearance, his bold, open chest, his smooth, glossy skin, his extreme sensibility, his proud and fearless aspect, and yet ever-willing subjection to the mandate of his ruler, render him an object every way interesting to the inquisitive and the admiring mind. The zebra, which is of the horse kind, is a native of Africa, and frequently exhibited in this country. It perhaps excels the horse in beauty, as much as the latter excels the former in usefulness. "The delicacy and regularity of its colouring, exceed all description. Every part of it is striped alternately black and white, with unerring exactness. Yet, with all its perfections, our endeavours to tame it have been hitherto unsuccessful."

Among the next tribe we cannot pass by the cow, the object of such general utility. Besides yielding us her calves, which are conducive to the

support of our bodies, she supplies us with an abundance of the most wholesome and nutritious milk, so indispensable an article in the household economy. The sheep affords us not the same advantages, yet fills up an important place in the scale of being. Besides the flesh of the sheep being most wholesome nourishment, its wool is extremely useful, and is, by the wise Disposer of nature, happily adapted for various articles of clothing.

The wisdom of Providence appears two-fold in the fleecy robes of the sheep—as it affords it (1.) a warm covering during the coldness of winter, and (2.) when its weight and thickness would, in the warmth of summer, prove burdensome, it holds out a powerful stimulus to man, (from the profit attendant on the labour,) to ease it of the cumbersome load, in that season which we denominate sheep-shearing.

The wisdom of Providence also appears conspicuous, in withholding from this, and other docile victims to our appetites, every thing like a knowledge of its future destiny. The heedlessness of the little frolicsome lamb, the nutritious offspring of the sheep, is finely sketched by the poet in the following verses—

The lamb thy riot dooms to bleed to-day,
Had he thy reason, could he skip and play?
Pleas'd to the last, he crops the flowery food,
And licks the hand just rais'd to shed his blood!
O! blindness to the future, kindly given,
That each may fill the circle mark'd by Heaven.

POPE.

Among the deer tribe, the stag or hart, (the

female of which is called the hind,) for his noble gait and amiable disposition, ranks, says an anonymous author, among the first of quadrupeds. His head, from the beautiful cluster of horns which dignify and adorn it, has a wild and romantic appearance. His size, his strength, his make; sprightly and graceful motions; his eyes, which are said to be much finer than those of any other animal in our island, and sweetly shining and sentimental; render him a pleasing object in creation—and afford new instances of that unbounded variety and beauty so discoverable in the wide creation.

Of that knowing, useful, and faithful animal, the dog, much might be said; but, as he is so well known, I need not describe his pleasing qualities. Suffice it to say, that History has lent her aid in immortalizing him, and Poetry added the deserved meed of praise. The pleasing mention which is made by Homer of the affectionate dog of Ulysses, who more than recognized his master after an absence of twenty years, is very pleasing, and I am tempted to read a part of the passage.—

He knew his lord; he knew and strove to meet;
In vain he strove to crawl and kiss his feet;
Yet all he could, his tail, his ears, his eyes,
Salute his master, and confess his joys.

.....
This dog, whom fate thus granted to behold
His lord, when twenty tedious years had roll'd,
Takes a last look—and having seen him—dies!
So clos'd for ever faithful Argus' eyes.
Then pity touch'd the mighty master's soul,
And down his cheek a tear unbidden stole.

But we must pass by, Lorenzo, the wily fox, of

which so many things have been said; the rich ermine, so famous in Siberia, and whose skin is said to be an article of commerce all over the North of Europe; the sworn foe of the crocodile, denominated the ichneumon, which is said to enter the mouth of the former when asleep, and to eat up its vitals; the timorous, the gentle hare, so cruelly persecuted by the human species; the prolific and burrowing rabbit; the lively and playful squirrel; the harmless and defenceless guinea-pig; the earth-born mole; the ugly but useful hedgehog, and him whom Shakspeare has termed the "*fretful* porcupine," of which we have all heard; the leaping, bounding frog; the crawling toad; and the industrious, mechanical beaver; and proceed to an investigation of another, and a different tribe of creatures—equal displays of Almighty Power—and concerning which, were the whole history given,

"I could a tale unfold, whose lightest words
Would harrow up the soul."

SECTION XII.

OF THE ANIMAL WORLD.

Fourth Division—The Savage or Untamed Tribes.

THE foremost in the rank, I would now bring before you, is the noble, the generous, the majestic lion. He has justly been denominated the king of beasts. His voice of thunder, his bold and commanding aspect, his dreadful shining mane, his fiery eye-balls, his fearful jaws and destructive teeth, his prickly tongue, his monstrous paws, added to his unprecedented strength when roused to the combat, point him out as one of the most wonderful instances of the awful power of God. Generosity is one of the characteristics of his nature. And though so fierce and terrible when impelled by hunger, he will not in general make an attack under more favourable circumstances.

Next to the lion comes the tiger, so well known for his ferocity and beauty. As if to shew the diversity of his power, the Divine Being has endued him with all the ferocity of the lion without any

of his good qualities. "He kills merely because he delights in carnage; and his courage and rage seem to increase only as he meets with no resistance." But see a new instance of the power of creative Wisdom, in the beautifully spotted panther or tiger, which is found in the hottest and least habitable climates! See too the sagacious, nocturnal wolf—

"By wintry famine rous'd
Cruel as death, and hungry as the grave!
Burning for blood! bony, and gaunt, and grim!"

And mark too the wily fox, and the keen and furious hyena! The latter is so horrible a creature, so monstrous in its appetites, and so ferocious, that the very idea of one being let loose in our favourite isle, would fill us, at this pleasurable moment, with the most thrilling horror and fear. Observe likewise new wonders in the abhorred ourang-outang, a species of the monkey tribe. These are sometimes taller than a man, and, with a form approximating to ours, walk upright. The strength of one is said to be equal to that of ten ordinary men! Baboons, another kind of monkeys, are less in stature, being from three to four feet high. They have a formidable, crooked tail, of about eight inches in length, are covered with long, thick, reddish hair, and walk upon all-fours. In the common monkey we do not behold many of these awful features. His ferocity diminishes with his size; but his artifice and cruelty, unless kept under by chastisement, are sufficiently obvious to appear truly formidable. Thanks be to the wise

and beneficent Author of Nature, that these abhorred and cunning creatures do not frequent our isle.

But I must not, Lorenzo, although our time is hastening on, omit to mention the fearful crocodile. Its size, being sometimes thirty feet long, (though its usual length is eighteen,) added to its enormous strength, malignant dispositions, and voracious appetites, render it one of the most terrible and deadly of the amphibious race. Its history is well worth our attention, but cannot engage us now. Its places of rendezvous are along the banks of great rivers; and it fearfully prevails about the banks of the famous Nile, in Egypt, a province of Africa.

His bulk is charg'd with such a furious soul,
That clouds of smoke from his spread nostrils roll,
As from a furnace; and when rous'd his ire,
Fate issues from his jaws in streams of fire.
Strength on his ample shoulders sits in state;
His well-join'd limbs are dreadfully complete!
His flakes of solid flesh are slow to part;
As steel his nerves, as adamant his heart!

DR. YOUNG.

Though not so formidable in its nature, the ponderous and sagacious elephant must here come in for a share of attention. "Surely it must fill the mind with no ordinary conceptions of greatness and sublimity, to see such a huge mass of matter in a state of animation;" and it seems "as if Nature intended solely by him to try how much power and bulk, independent of all inferior considerations, could be thrown into one form." His size and propensities are too well known to you, Lo-

renzo, to need any laboured description. His enormous bulk, added to his height, which is from seven to fifteen feet, and his altogether singular appearance, render him one of the wonders of this our lower world. He is remarkably mild and generous when unmolested; but, should his anger be roused, he will not fail to convince the aggressor of his ability and his determination to avenge the wrong.

The Savage Tribes continued.

But of all the creatures of Almighty Power, it would perhaps be unpardonable to omit that prodigy of bulk and strength among amphibious animals, the sea-horse, called the hippopotamus, or behemoth. This huge creature, from the extremity of his proboscis to the root of his tail, measures about seventeen feet; and his head is full four feet in length, and nine in circumference. He has a body of an enormous size; his jaws open two feet wide, and his teeth (of which he has eight) are more than a foot long! “He is,” in the energetic language of the Book of Job, “the chief of the ways of God. He moveth his tail like a cedar; his bones are as strong pieces of brass; his bones are like bars of iron!” Of all the descriptions I have ever read of this celebrated creature, none please me better than the animated description of Dr. Young, in his Paraphrase on part of the Book of Job. As my memory will not allow me to do justice to the passage, I am tempted, Lorenzo, to

read it verbatim. The beauty of the imagery, and the glowing scenery, will, I trust, be a sufficient atonement for the length of the quotation.

..... Though large his frame,
Smooth is his temper, and repress'd his flame
While unprovok'd. This native of the flood
Lifts his broad foot, and puts ashore for food:
Earth sinks beneath him as he moves along
To seek the herbs and mingle with the throng.
See, with what strength his harden'd loins are bound
All over proof and shut against a wound;
How like a mountain cedar moves his tail!
Nor can his complicated sinews fail.
Built high and wide, his solid bones surpass
The bars of steel; his ribs are ribs of brass;
His port majestic, and his armed jaw,
Give the wild forest, and the mountain, law.
The mountains feed him; there the beasts admire
The mighty stranger, and in dread retire
At length his greatness nearer they survey,
Graze in his shadow, and his eye obey.
The fens and marshes are his cool retreat,
His noontide shelter from the burning heat;
Their sedgy bosoms his wide couch are made,
And groves of willows give him all their shade.
His eye drinks Jordan up when fir'd with drought;
He trusts to turn its current down his throat;
In lessen'd waves it creeps along the plain;
He sinks a river, and he thirsts again!

But we must not forget that wonder of height and bulk, the giraffe, or camelopardalis, a specimen of which, with a variety of other animals, idols, &c. &c. I lately saw at the Missionary Museum in London. Its common height is said to be from fifteen to seventeen feet, but some have been seen more than twenty feet. The specimen I saw was about sixteen feet. According to the catalogue of the museum, this peculiar animal was known to the Romans in early times; inhabits the

interior parts of Africa, and the forests of Ethiopia; is remarkable for the great disproportion of height between the fore and hind parts; its head is like a stag's, neck slender, tail long, with strong hairs at the end; the whole of a dirty white, marked with large broad rusty spots. It is very timid, but not swift; runs awkwardly, as you may suppose from its stature, and is easily taken. It browses on trees, yet can stoop so as to feed on the grass, and drink water from the brook. The one I saw was shot in the Griqua Country, South Africa, by Mr. Campbell's party, in his Missionary Tour of 1814, and towards the latter end of the month of July. It certainly exactly corresponds with the sketch here given, and with that of the Catalogue of the Missionary Museum, p. 14, 15.

But a new race of creatures present themselves before our view—a race awfully frightful and beautiful—I mean the serpent tribe. In these the Most High, in a new variety of ways, has displayed his awful power; and there are no creatures, perhaps, to which humanity has greater antipathies than to these insidious and artful enemies. Their characteristics are cruelty and cunning. They are said to be thirty, forty, and fifty feet long, their size varying according to their age. Their venom is of a most dreadful nature; their appearance not unfrequently extremely beautiful; and though very rapacious, their abstinence, when necessity enforces it, is truly wonderful and confounding. The great Animator of Nature here appears to write, in indelible characters, “Nothing is too hard for the Lord;” for it is said to be a fact, that these creatures, if deprived by accident

of their supplies, “can still bear famine for weeks, months, nay, for years together! Vipers are often kept in boxes for six or eight months without any food whatever; and there are little serpents sometimes sent over to Europe from Grand Cairo, that live for several years in glasses, and never eat at all, nor even stain the glasses.”*

Survey the venomous rattle-snake; the eastern whip-snake; the black-snake; the amphisbæna, or double-headed serpent; the prince of serpents, (a native of Japan,) so called from its unrivalled beauty; the gerenda of the East Indies, to which the natives of Calcutta pay religious homage; the depona of Mexico, a most terrific creature; the great jeboya of Java and Brazil, which has been seen fifty feet long; and lastly, the boiquacu, another of this enormous and terrible family, which has been known to swallow a goat whole;—and then say, are these like the products of chance or accident, or manifest evidences of a POWER DIVINE?

* Beauties of Natural History.

SECTION XIII.

OF THE ANIMAL WORLD.

Fifth Division—Birds in general.

HAVING dwelt so long upon the scenes of earth, “let us now take our flight from terrestrial dross, and grow acquainted with the inhabitants of the air. Cast your eyes on that bird who wings the air. Nothing is more natural to eyes that have been habituated to such a sight, and nothing is so astonishing to the optics of reason. It is evident that a passage through the air, which has been denied to other animals, is open to these. The fact is certain—and yet seems to be altogether impossible. A bird in flight is a mass raised aloft in spite of the weight of the air and the powerful gravitation impressed on all bodies, which impels them to the earth.”

Let us begin our description of birds with the most interesting portion to be found in nature—I mean, Lorenzo, those inhabitants of the airy regions, who delight us with their melodious warbling.

..... "I love to be awake, and hear
Their morning songs twitter'd to young-ey'd day."

These we need not go far to discover—they are to be found hovering near the abodes of man. "This delightful race of animals embellish our forests, enliven our walks, and, through all the retreats of rural retirement, fill our hearts with inexpressible gaiety. From them we have nothing to fear. Their pleasures, their desires, and even their animosities, animate the general complexion of nature, and give harmony to meditation."

Among birds of this class we may particularly mention the lark, the linnet, the canary, the goldfinch, and the nightingale. These charm our ears with their delightful songs, and ever and anon give music to the grove. In reference to the first, the tuneful lark—

..... How sweet the song
Day's harbinger attunes! I have not heard
Such elegant divisions drawn from art.
And what is he that wins our admiration?
A little speck that floats upon the sunbeam!
What vast perfection cannot Nature crowd
Into a puny point!

HURDIS.

And concerning the nightingale, the lovers of song have said the most enthusiastic things. "What the peacock is to the eye," says the author of the *Spectacle de la Nature*, "the nightingale is to the ear. It visits us only in April, and leaves us again in August. Nor is it ever found but in the most southern parts of this country." But there are none with whose history I am more pleased than with that of the American mock-

bird, as it is termed. It is a plain bird to the eye, about the size of a thrush, of a whitish grey colour, and a reddish bill. This facetious little creature “is possessed not only of its own natural notes, which are musical and solemn, but it can assume the tone of every other animal in the wood, from the wolf to the raven He at one time allures the smaller birds with the call of their mates, and when they come near him, terrifies them with the scream of an eagle. There is not a bird in the forest which it does not *take off*, as the phrase is, and none which it has not deceived by its call.” He frequently perches himself on the chimney top, and “pours forth the sweetest and the most varied notes of any bird whatever. He often builds his nest in the fruit trees about houses, feeds on berries and other fruits, and is easily rendered domestic.”

But, “of all that flutter in the garden, or animate the landscape, the humming-bird (of America) is the most amiable, and, for its size, the most splendid. It is not bigger than a hazel-nut, and yet completely furnished out with a bill, feathers, wings, and intestines, exactly resembling those of the largest kind. The feathers on its wings and tail are black, and the exquisite down on its body and under its wings, is of a greenish brown, with a fine red cast or gloss, which no silk or velvet can imitate. It has an elegant crest, green at the bottom, and, as it were, gilded at the top, which, in the middle of its little forehead, sparkles in the sun like a diamond or a star. The bill is black, straight, slender, and the length of a small pin. As soon as the sun rises, multitudes

of these beautiful creatures are seen fluttering about the flowers," from which they extract the liquid sweets, on which alone they subsist. It is impossible for the lover of Nature to quit this part of our subject but with feelings of regret; and I know you would wish me, Lorenzo, long to linger on the charming theme. But our time forbids. I am particularly pleased with the structure and mechanism of the birds' nests. Some build them, with instinctive forecast, upon the tops of trees, far away from the intrusion of lawless depredators, and others on the ground, under a canopy of grass and trees. What too is remarkable, each species has a particular way of building and laying out the furniture of the apartment.

..... Mark it well, within, without;
No tool had he that wrought, no knife to cut,
No nail to fix, no bodkin to insert,
No glue to join; his little beak was all.
And yet how neatly finish'd! What nice hand,
With every implement and means of art,
And twenty years' apprenticeship to boot,
Could make me such another?

HURDIS.

I confess myself delighted also with their conjugal tenderness and attachment to their young, as well as courage in defending them. In short, can we fail of being charmed here, where we have the "brightest colours, the most lively manners, the sweetest music," and all that is agreeable and lovely, concentrated?

Quitting these lovely tribes of the tenanted air, we proceed to others of the feathered race—

which, although they may not afford us the same satisfaction, are yet wonderful instances of creating power and wisdom. It is said that there are at least eight hundred different kinds of birds. To name them would be impracticable, and to describe so considerable a number would be much more so. All I can attempt will be a selection from the varied tribes of this numerous family. And this must be done with the greatest brevity; it being impracticable with our limited plan to go far into a detail, however pleasing it might appear.

Birds continued.

The rapacious, towering eagle; the voracious vulture; the plundering buzzard; the nocturnal screech-owl; the depredating raven; the carrion crow, whose name imports his nature; the prating jackdaw; the rook; the beautiful but plundering magpie; the pretty variegated jay; the chatterer of Germany; the insect-seeking woodpecker; the bird of paradise, found in the delightful woods of the east; the cuckoo; the saucy-tongued parrot; the gentle, the innocent dove; have each peculiarities that might well engage our attention, and well repay the most minute investigation. Among a larger race which hover about the earth, and which are in a measure subject to man, may be reckoned the cock, so common among us; the beautiful and unrivalled peacock, of which the Greeks and Romans are said to have been so

fond;* the turkey, the pheasant, &c. What must be the beauty of the latter bird, to cause the celebrated Solon to say, "Having seen the beautiful plumage of the pheasant, no other finery can ever astonish me?" In short, in this part of animated nature, as well as among insects, new beauties, new wonders, rush upon us at every step. And if Chance adorned these various creatures in their unrivalled hues, and gave them that regularity in size, disposition, and habits, which always characterizes the same members of the same species, Chance must be one of the most wonderful mechanists in the universe; although we have no idea of finished mechanism if Chance be not excluded!

There are a few others of the feathered race which must not be forgotten. And behold the towering ostrich! Mark its uncommon height and slim appearance! and wonder at the new variety here so discoverable! It is the largest of birds, and is said to be seven feet high, reckoning from the ground to the top of its head. It has wings of a prodigious size when expanded; and its plumage, which is generally the same in all, is a mixture of black and white. It is said it eats most voraciously, but drinks nothing. Its food is of the vegetable kind, and its life is at once inno-

* How rich the peacock! what bright glories run
From plume to plume, and vary in the sun!
He proudly spreads them to the golden ray,
Gives all his colours, and adorns the day;
With conscious state the spacious round displays,
And slowly moves amid the waving blaze.

cent and social. These creatures live in the sandy deserts abroad; and, says my author, "they may be considered as filling up one of those chasms of nature, which separate one tribe of animals from another," being similar in appearance to the camel kind, and seem as if covered with hair instead of feathers. Some say they lay their eggs in the sands, and leave them to accident; but others deny this, and say they look after their young with great tenderness. Their uncommon fleetness, when put to the chase, is, however, generally allowed.

Mark also the singular and indolent pelican, which seldom rouses from its lethargy unless impelled by hunger. These birds have a bill of about fifteen inches long, and a pouch beneath it which will hold fifteen quarts of water! This bag they draw up when empty; it hangs under the edge of the chap, reaching half way down the neck. "When empty it is not seen; but when the bird has fished with success," which it does when its hunger returns, "it is then dilated to an incredible extent. When the bill is fully opened, a person may run his head into the bird's mouth," which, Lorenzo, I once saw a daring adventurer do, "and conceal it in this monstrous pouch."

Behold the stately swan cutting the liquid element in yonder pleasant stream! "When seen," says the author above quoted, "as it proudly rows in state, with arched neck between its white wings mantling, there is not perhaps in all nature a more lively image of dignity and grace." I cannot stay to describe its peculiarities, nor those of the gabbling goose, the waddling duck, the beautiful

kingfisher, the awkward crane, the unmelodious stork, the long-bellied woodcock, the beautiful great northern diver, &c. But surely the view we have taken is sufficient for our purpose,—to lead the mind “through Nature up to Nature’s God.” And if we have seen that the “flat and burning desert, the rocky cliff, the extensive fen, the stormy ocean, as well as the pleasing lawn, the sheltering wood, the solitary grove, and the gay shrubbery, have all their peculiar inhabitants”—surely it cannot be unreasonable to suppose that these had an original Former, have still a Preserver—and that it cannot be any one short of that great and stupendous Being we denominate God.

SECTION XIV.

OF THE ANIMAL WORLD.

Sixth Division—Man, the Lord of Creation.

..... Creation's heir!
The world, the world is mine!

GOLDSMITH.

HAVING surveyed the animal creation thus far, we are led, in the last place, to the consideration of the wonders appertaining to the king of animals, man—who appears as the sovereign of the inferior tribes, and exacts from them a willing and a cheerful obedience.

“’Tis for *his* sake all nature moves,
And stars their circles keep.”

And is there any evidence, in the various parts which compose the creature, man, of the work of a Being of a superhuman order—as much above that of chance as any of the beings before considered? I am not afraid, indeed, of having an answer in the negative, both of us having before paid some

attention to the subject. I am much pleased with a thought which I have somewhere met with, illustrative of the subject in hand, to this effect:—Though no shining sun nor twinkling star bedecked the curtain of the sky; though neither vegetable, beast, nor bird, were seen on the surface of this globe, nor lurking gem beneath; though the great sea slept in profound silence, and the air had left no thunder to pronounce its Maker;—yet MAN at home, within himself might find the Deity immense; and in that frame, so fearfully, so wonderfully made, see and adore his providence and power!

To this, Lorenzo, I shall add some observations from a work of my own. What a diversity of parts compose the human frame! how much to evince, as just hinted, that we are fearfully and wonderfully made! The rapid circulation of the vital fluid; the quick pulsation of the heart; the elasticity of the limbs; the several senses with which we are endowed; the immortal principle within; the powers of the mind and understanding, joined to all the discoveries of the sons of Æsculapius; are enough, surely, to convince any Atheist, that there is an all-wise, all-powerful Creator; and that such a combination of parts is His work, and cannot possibly be attributed to uncertain chance.

“To bring this subject more within the grasp of human comprehension,” says the late Rev. David Simpson, when referring to the human frame, “let us take it as it were to pieces, and examine the several parts of which it is composed, and we shall find a perfection among its several powers,

and an adaptation to its situation in the grand scale of existence, far surpassing human skill. Let the most perfect anatomist that ever existed make his observations upon the human frame; let him explore the whole and every part with the greatest degree of accuracy, knowledge, and judgment, that ever centered in man; and then let him honestly say whether he could suggest the smallest improvement in any one respect. If he were an Atheist before such investigation, like the celebrated Galen, he would be converted to the belief of the Divine existence—would compose a hymn in praise of the Creator of the world—and sing, with the great progenitor of mankind —

“ These are thy glorious works, Parent of good!
Thus wondrous they; Thyself how wondrous then!”

There is a manifest superiority in man over the brute creation in his walking upright; but in some particulars he seems to come into the world with fewer advantages than they. While animals in general are born with their clothing ready prepared and fitted for them, man comes into the world naked and destitute; and while other animals are speedily able to help themselves, and to procure their support unaided by their parents, man not only comes into existence in an helpless condition, but continues so for a great length of time: nor is he able, for a series of years, to minister to his own comfort, much less to provide for his own maintenance. He requires the most assiduous attention in order to insure his well-being, and no small expence too; and frequently, after the

greatest care, is bowed down with the weight of infirmities which would make but little impression upon the less favoured part of the animal creation. Yet, with all these abatements, the characteristics of his nature are great and important. There appears to be a dignity stamped upon his nature, in vain sought for among all other beings in the animal creation. The gift of speech, denied to all besides, wonderfully raises him in the scale of being; though his tongue, alas! is too seldom employed in the praise of Him who made him. The sense of seeing, of hearing, of smelling, and of taste and touch, are possessed by animals in general, and, therefore, are not the characteristics of man; yet, while this must be admitted, it is equally true, that these senses are not enjoyed with that peculiar zest by the irrational as they are by the rational creation. This is more particularly the case in reference to those who are the spiritual children of the Most High—who have begun to see what is the true end of living—and who are thus raised infinitely higher, in these respects, than the mere natural man. While the brute beast has an eye which naturally dwells upon the grosser parts of matter, man has an eye formed for looking upwards; which, not content with dwelling upon these lower scenes, can pierce through the veil that hides distant and obscure objects; which can traverse through trackless space, and (especially when aided by the light of revelation) can ken the objects which are dim to all besides. While, moreover, one has an ear which is ever open to its interests, and which is chiefly subservient to that purpose, the other possesses an ear

which is finely formed for discriminating sounds, and which is capable of affording him the most refined enjoyment, (more especially when connected with religion,) by reason of that noble understanding which is the characteristic of his nature. While too the animal gratification in one is assisted by the sense of smell, and animals are thereby instinctively led to their favourite food; in the other that sense answers a higher and a nobler purpose, when the objects upon which it is exercised are pure, and is capable of ministering largely to the refined enjoyments of his nature. While, likewise, one possesses the sense of taste in its grosser forms, and appears to relish the peculiar food that is suited to its nature, and there to rest satisfied; the other seems to possess that sense in a very enlarged degree, and to be capable of enjoying, not only that greater diversity of food which is provided for him, but of enjoying it with a zest of a peculiar kind, unknown to the mere animal creature. And while, in the last place, the sense of touch is possessed by brutes as well as by man; yet the latter certainly appears more exquisitely alive to pleasurable or painful feelings, arising from the acuteness of this sense, than do any of the brute creation.

These considerations arise, in some measure, out of the investigation in which we have just been engaged. You well remember, in our survey of the heavenly bodies, as well as in the wonders of these lower scenes, how the eye was charmed with the objects which it surveyed; and then the ear, how it was held a willing captive by the sweet melody of the grove; and the sense of smell, how its

gratifications rose above those of mere animal existence, as we paced the pleasant fields and beauteous flower-gardens, and inhaled the balmy breeze; and then the luscious fruit, and the other objects of mental or corporeal taste, how they seemed to lift us above the grovelling appetites of the mere brute; not to say how much more alive were the feelings of our nature, and susceptible of the most tender touches of pleasure, to what were discoverable in the brute creation around us.

Beyond all this, the spiritual part of man—the immortal soul—raises him infinitely higher than every other part of the animal creation. And, viewing the great things of which he is capable when refined by education and religion—the dignity stamped upon his nature, and the helpless condition in which he is originally found, in conjunction with that depravity, which, alas! too often marks his history—we are led to ask, “Lord, what is man?” and to exclaim, in the language of the immortal bard—

How poor, how rich, how abject, how august,
How complicate, how wonderful, is man!
How passing wonder He who made him such,
Who center'd in our make such strange extremes!
An heir of glory! a frail child of dust!
Helpless immortal! insect infinite!
A worm! a god!—I tremble at myself,
And in myself am lost!—How reason reels!
O what a miracle to man is man!

YOUNG, Night I.

But, if we would fully know his nature, Lorenzo, and his high and important destinies, we must go to the page of Inspiration, where ALONE we can

find satisfaction. But as this would ill accord with our plan, while we are merely listening to the voice of Nature and of Reason, and, as I shall have a future opportunity of so doing, I must wave it at present, satisfied of the favourable result of those enquiries which we have made into the animal, vegetable, and mineral kingdoms—the heavenly bodies—and the phenomena of the earth and air.

SECTION XV.

A BRIEF REFUTATION OF ATHEISM.

*State of the Argument—Recapitulation—Inferences—
Reflections—Conclusion.*

The Christian creed is, "I believe in God the Father, Maker of heaven and earth." The Atheist's creed is, "I believe in nothing, the origin of all things." Which do you think is most philosophical?

DR. GROSVENOR.

"Dull Atheist! could a giddy dance
Of atoms, lawless hurl'd,
Construct so wonderful, so wise,
So harmoniz'd a world?"

HERE, Lorenzo, I take my stand. These are palpable evidences of the being and attributes of the Deity. That union and harmony of all the parts of Nature in one simple end, and the uniformity of means that conduce thereto, evidence the UNITY of the great Contriver; and, next to his Unity, his POWER seems admirably displayed by the varied works of his hands, particularly in

forming and sustaining the worlds which float on high. Linked with his Power or Omnipotence is that WISDOM every where so discoverable, in keeping the earth and sea in their proper bounds; nor less evident is the INDEPENDENCE of the Deity, and that he pleased himself alone in the disposal of the works of his hands. And lastly, that attribute of his nature, unsullied GOODNESS, whatever may at first sight appear to the contrary, seems pleasingly set forth in the products of his creating power.

There are two kinds of arguments for the Being of a God. The first are arguments *à priori*, or those taken from THE NECESSITY OF THE DIVINE EXISTENCE. The second are arguments *à posteriori*, or those taken from THE WORKS OF NATURE. The latter, being the most interesting and popular, have already engaged our attention; though the practical inferences deducible therefrom remain yet to be considered. But before we proceed to consider these, I would offer a few observations on the first kind of proofs, I mean those taken from the *necessity* of the Divine Existence. And what I intend is done so much to my mind, and withal so ingeniously, by the sprightly and perspicuous Addison, that I shall offer it verbatim.

1. 'Tis certain, he says, that no being could have made itself; for if so, it must have acted before it was, which is a contradiction.

2. That therefore some being must have existed from all eternity.

3. That whatever exists after the manner of created beings, or according to any notion which

we have of existence, could not have existed from eternity.

4. That this Eternal Being must therefore be the Great Author of Nature—the Ancient of Days,—who, being at an infinite distance in his perfections from all finite and created beings, exists in a quite different manner from them, and in a manner of which they can have no idea.*

Admit a God, that mystery supreme,
That cause uncaus'd,—all other wonders cease;
Nothing is marvellous for Him to do:
Deny Him—all is mystery besides.

DR. YOUNG.

Before we proceed to argue, Lorenzo, upon the evidences adduced, in their collective capacity, it will not be amiss rapidly to glance at the ground we have gone over.

Our first enquiry, after the preliminaries were dispatched, was into those vast and inconceivable bodies, the heavenly host; including the sun, the centre of the solar system, and those moving worlds, the planets, with those astonishing and countless orbs, the fixed stars, which glitter in the boundless heavens. Our next excursion was to the flaming comets, and to ascertain the nature of eclipses of the sun and moon, together with the causes of those northern lights which sometimes appear in the heavens. From thence we repaired to that invaluable discovery of Sir Isaac Newton, which explains so wonderfully many apparent impossibilities in astronomy, &c. the law of attraction

* Addison's Miscellaneous Pieces.

or gravitation impressed upon all bodies, by which they keep their assigned stations in the vast universe. Anon we ascended to the higher regions of the air or atmosphere, to enquire into its nature, to ascertain its all-important uses, and the height to which it extended. We then observed those floating meteors, the clouds, hung above us on high, and suspended upon nothing by the mighty power of the Great Contriver of Nature, and the phenomena of their ascending in water-spouts from the ocean, and afterwards dispersing themselves in showers of rain upon various parts of the earth. The birth-place of hail and snow, and the crooked lightning, and the hoarse thunder, with their causes, next engaged our attention, and raised our meditations sublimely high.

From these higher objects we descended to the earth, and surveyed its constituent parts, land and water. In our first division of the land, the astonishing variety and deeply-interesting tribes of the vegetable world engaged our attention; in our second, mountains and their phenomena; and in our third, the wonders of the mineral kingdom. In the second division of the earth, the waters of the ocean, and some of the wonders of the mighty deep, with the causes of springs, rivers, the tides, &c. claimed our notice, and rewarded our attention, by increasing our veneration for their Author, and raising us to his sublime abode.

The heavens and the earth being thus far surveyed, the animal world next called upon our attention. And having just peeped into the mighty reservoir of waters, we naturally made the tribes of the ocean, and of rivers in general, our first

division of animated nature. The second division of the animal world contained that numerous and wonderful race called insects, with their peculiar construction and varied appearances; the third, some terrestrial animals, and their peculiarities; the fourth, the savage or ferocious inhabitants of the deserts and forests, including the more august quadrupeds; the fifth, birds of note or prey, and those of uncommon size or hue, &c.; and the sixth, that wonder of creating might—man, the lord of creation; whose characteristics or peculiarities, in the last place, engaged our attention.

From this retrospect it appears how impracticable it would be, to argue from each and every part in individual order. The most that our time will allow, will be some general arguments and inferences from the more prominent parts in the Book of Creation, and in contradistinction to Atheism.* And this I shall do pretty much in the language of my “Christian Shield,” towards the conclusion of the second essay; which I shall make no apology for quoting, as the present attempt is intended, in some measure, to supersede it.

Here, then, let us pause, to give place to some reflections arising out of the subject. And first I remark, it appears obvious, (and, indeed, beyond dispute,) that the mightiest of human works are

* Atheism is of two kinds—*practical and theoretical*. But because the former arises out of the latter, it is here chiefly dwelt upon.

no further excellent than as they are subject to certain regulations, and governed by the rules of order.—For instance, if a skilful artisan were to undertake to build a bridge, and, when he had signed the contract, were to employ a number of ignorant and unskilful men—men, in fact, who were unacquainted with the business—and then leave it to *them* promiscuously to carry on the building, and direct its varied movements,—what, think you, would be the probable result? Suppose they actually succeeded in rearing the superstructure, would it, think you, long sustain the shock of the outrageous billows, when they rolled in anger at its base? Would not the natural consequence be—destruction to the whole fabric, and to all who came in contact with it? Now, apply this to the tenets of Atheism, and the inference, I imagine, will be natural and easy. If all things, as the Atheist maintains, were put in motion by unskilful chance, on what principle can he account for the evident traces of design and contrivance—of order and regularity—of the fitness of every thing for the situation it holds, and its adaptation to the apparent end of its creation? How is it, I ask, that the sun has never forgotten to shine, or to give his kind and refreshing heat? How is it that the stars, which, if guided alone by chance, might have been hurled from their station in an unexpected moment, have never ceased to keep their appointed bounds, and to move in a prescribed order, for hundreds and thousands of years? How is it that they have not fallen upon our diminutive world, and sunk it beneath the pressure?—for the destruction of our world, when

compared with the heavenly bodies, would, as the eloquent Chalmers observes, be only like the falling of a leaf in a forest, it being a mere speck in comparison with the vaster regions on high. How is it that day and night have alternately had the sway? that the seasons have regularly revolved? that the sea, with its multitude of waves, has kept its appointed bounds? or that the various creatures which are subject to man, have moved in their subordinate stations, and ever filled up their proper place in the scale of being? How can the uniformity discoverable be accounted for on any other principle, than by referring it to the superintendency of a *great, a wise, a powerful God?* who guides the wheels of nature; who first set them in motion; who appointed the sun his bounds; who ordained the goings forth of the moon; who fixed the stars in the firmament; who bade day and night, summer and winter, alternately to appear; who settled the earth and established it; who appointed the sea its bounds, that it cannot pass; whose glory fills the heavens, and whose praise is in all the earth!

And here permit me to mention an anecdote of one who was well acquainted with the sublime science of astronomy, and the evidences its discoveries afford relative to the Divine existence. Perhaps the absurdities of Atheism were never placed in a more just point of view.—

“The famous astronomer, Athanasius Kircher, having an acquaintance who denied the existence of a Supreme Being, he took the following method to convince him of his error, upon his own principles. Expecting him upon a visit, he pro-

cured a very handsome globe of the starry heavens, which, being placed in a corner of the room where it could not escape his friend's observation, the latter seized the first occasion to ask from whence it came, and to whom it belonged. 'Not to me,' said Kircher, '*nor was it ever made by any person, but came here by mere chance.*' 'That,' replied his sceptical friend, 'is absolutely impossible: you surely jest.' Kircher, however, seriously persisting in his assertion, took occasion to reason with his friend on his own atheistical principles. 'You will not,' said he, 'believe that this small body originated in *mere* chance, and yet you would contend that those heavenly bodies, of which it is only a faint and diminutive resemblance, came into existence without order and design!' Pursuing this chain of reasoning, his friend was at first confounded, in the next place convinced, and ultimately joined in a cordial acknowledgment of the absurdity of denying the existence of a God."

Again. Observe the mechanism of a watch. How wonderfully do the several parts agree in forming a correct estimate of time! When set in motion by the hand of Science, and subjected to the rules of uniformity and order, the effects are very apparent; but if, on the contrary, its several parts were promiscuously thrown together, and subjected to no rule or order, how deranged, how confused, would every part appear! how evident would it then be, that chance, and not a wise and skilful workman, had set its various wheels in motion, and produced the derangement every where so visible. The same, or similar remarks, are

applicable to an organized army, to the arrangement of naval forces, to the government of states and kingdoms, to the arts of life and society, and so on. Now if, in all these instances, order and systematic arrangement be so necessary, and so plainly evince the superintendency of a designing and a conscious agent, will not analogy also shew, in reference to the uniformity every where so observable in nature, that there is no such thing as chance, either with regard to the original creation of the universe or its preservation and harmony to the present moment?—Hence we arrive at this conclusion—that, as there are evident marks of contrivance, there must have been a contriver; as there are undeniable proofs of wisdom, this contriver must have been wise; as there appear to be, from the uniformity in the laws of nature, evident traces of an uninterrupted government and preservation of the universe, this contriver must be omniscient and omnipresent; as also there appear to be no limits to creating power, this contriver must be omnipotent and infinite; and as there are such numerous and undeniable evidences of purity, equity, and goodness, in the wide creation, notwithstanding some apparent contradictions, this contriver must, though incomprehensible, be holy, just, and good. *Ergo*—He must be worthy of our adoration and our praise.

Thus much, or nearly so, appears evident from the light of Nature alone; though, from the darkness of the human mind, we stand in need of a Divine Revelation, to aid us where reason fails. It appears, from an account in “Crantz’s Green-

land," that an uninstructed Greenlander, in common with his fellow-countrymen, had arrived at this conviction prior to the preaching of the missionaries. That which is purely a discovery of Revelation, the doctrine of an atonement by a Saviour, this man knew nothing about; but he was not without some idea of an all-powerful Creator. He himself had reasoned, from looking at a canoe, that certainly it could not have made itself; much less could a man, who is so much more complicated, have been his own creator. And though they could trace one generation back to another, still there must have been a first man; that man must have had a Maker; and that Maker, it was inferred, must be great, and wise, and good.

Once more. 'Tis observable of every human work, that it has its limits. When we look at some mighty fabric, and observe its impenetrable walls, its mighty pillars, its firm foundations, we are sometimes inclined to say,

"That strength-girt tower will last for aye:"

but a little reflection convinces us, that strong as it may appear, it *must* eventually yield to the corroding hand of time, and sink beneath the pressure of years. The ingenious time-keeper requires the *continual* aid of man after it has received the finishing stroke of the workman, or its wheels would soon forget their movements; *perpetual* motion is unattainable by the weak efforts of man. Now, allowing *chance* to have set the sun, and moon, and stars in motion, and to have wheeled the earth into its present station, is it not reasona-

ble and exceedingly natural to suppose, that what was set in motion by mere *chance*, would be subject to its weak guidance and feeble power! And however strong at first might have been the wheels of nature, may we not infer, that they would have yielded, ere this, to the powerful attacks of time, if only supported by feeble chance, as there would then be a great degree of doubt whether they would *uniformly* move according to the first impulse, and maintain their stations *unimpaired*, nor yield to the corroding hand of time? May we not also conclude, that the earth, in whirling on its own axis for so many thousands of years, would fail in some material point? or the sun have become weary with age? or the stars, as before hinted, have dropped from their orbits? as we see the monuments of the strength of art recede before us, and leave no traces of their former greatness. And how can we account for the *undeviating* performances of these vast bodies, (*so much above the power of man or the skill of chance,*) but by supposing, as before, that there is One who is continually regulating their movements, and upholding them by his power—who first ordained their going forth—and who is continually repairing, if I may so speak, what would otherwise yield—to the ravages of time and of years?

Indeed, so monstrous is the inconsistency of referring these evidences of the Being of a God to any cause except the GREAT FIRST CAUSE of all things—so contrary is it to the plainest dictates of common sense, that it may well excite our wonder how any, by a deliberate use of their reason, can embrace so monstrous an absurdity. If

there can be no *effect* without a *cause*, what shall we say of that multiplicity we have been considering, which present themselves to our understandings and our senses in every direction? The minutest worm, the smallest blade of grass, the atom that floats in the sunbeam, a *single* hair of the head, when minutely investigated, is enough to confound the Atheist, and to render ridiculous his sagest pretensions.

Will any, then, presume to tell us, notwithstanding the proofs to the contrary, that the diversified objects we meet with in creation, are merely the effect of blind and uncertain chance? Is it at all consistent with reason, that the strictest rules of order should arise out of confusion, or that the most unrivalled beauty should ever be the production of inactive, unconscious particles of matter? As well, nay, with more consistency, might I assert, that the present work is the offspring of mere chance;—that, by some unaccountable accident, the pen moved upon the paper in the form of letters, the letters formed themselves into words, the words into sentences, the sentences into paragraphs, the paragraphs into pages; and that the whole manuscript was finished in the same fortuitous manner, and without the aid of a conscious agent! In short, Atheism is involved in such an amazing labyrinth of inconsistency and absurdity, that it seems passing strange that it should ever find a place in the understanding of a rational and an immortal being.

Inferences and Reflections concluded.

Thus far, Lorenzo, have we gone in our enquiry. And now what shall we say of Atheism? If there is any truth in the statements now made—if there is a great and a powerful God—

“ And that there is, all nature cries aloud;”—

if he has so constructed things, that to deny *his* existence is to deny *our own*, and fraught with equal absurdities—and if, moreover, to teach us more clearly, he has given us a revelation of himself (which, as elsewhere shewn,* bears the stamp of Divinity) to aid us where the light of the human understanding fails—*then* must the situation of the Atheist be awful indeed! What a sad being! He is “ without hope and without God in the world.” He goes through life as a sad wanderer in a waste and howling wilderness, who is continually in danger from beasts of prey and the conflicting elements, but who acknowledges no guide, no director, determined to set up his own judgment in opposition to that of his Maker;—or as a ship launched on the mighty ocean, without a pilot or rudder; subject to every revolution of the watery element, and of the storms on high, when set in array against it! He tells you of the world being a combination of atoms, formed by the operation of blind chance! How sad the idea, when brought in connexion with his present peace and comfort! for, if the worlds around be suspended

* Referring to the Voice of Truth.

on the slender thread of chance, how reasonable is it that they should fill him with continual dread as he surveys their wonders, lest these worlds should, in an unexpected moment, burst in one general conflagration, and sink him into the nothingness from which he sprung! For I am free to confess, if I could once adopt the perverse creed of the Atheist, these and a thousand other fears would continually beset my path, and I should feel (on viewing the planetary systems around) all that terror which a person would be conscious of, when approaching the verge of some fabric falling into decay, whose jutting timbers and tottering walls might chance, in a moment, to fall, and bury all beneath in one promiscuous heap of ruins! Thus those objects which, when viewed in the mirror of Divine Revelation, reflect a double glory on the Creator, and inspire our mind with infinite pleasure and delight, would, on the principles of Atheism, fill us with terror; or, to say the least, with far other feelings than those of joy and satisfaction.

Thus sad is the influence of Atheism *in life*; and the *departure* of the Atheist is equally sad, and fraught with equal uncertainty. In the article of death, there is nought but an aching void, when he views the principles for which he has been contending. This life, which, at best, he found to be a state of trials and sorrows, is about to close upon him—the time of his departure is at hand—the cold grasp of Death he has already felt, and a few moments more will make the insatiable tyrant impatient of delay. Well, what is the ground of his consolation? what the hopes that *now* fill his bosom? Alas! to talk of consolation, he esteems

a folly, and his hopes—what are they? Not to be borne on the wings of seraphic spirits, and transplanted to the paradise above, amidst the songs and symphonies of angels. No! these are hopes which he leaves to those who, he affects to say, have been following the effects of priestcraft, (though these hopes alone are *now* truly valuable.) And he hopes—how shall we name it?—to sink into annihilation like a dog, or on a level with the vilest reptile that moves on the face of creation! His highest hope is to sink into his primitive nothingness; and he dies *hoping*, rather than *believing*, that such will be his fate.

O, hast thou ever beheld the shipwrecked mariner gasping for breath, and endeavouring, in vain, to cling to some weed for support, and then sinking beneath the watery element, for want of that assistance he so eloquently implored? Or hast thou ever seen the distracted victim of destruction appearing at the shattered windows of the consuming tenement, the crackling embers falling around, and at last burying him beneath their ruins? Ah! thy nature, if susceptible of sympathy, must needs mourn at such sad spectacles—thine eyes o'erflow with tears when witness to such scenes of complicated misery. Yet, sad as the exit of these appear, infinitely more sad is the departure of the Atheist! These sunk to rise no more in *this* world, but their immortal part *might* be safe, and their dismissal from earth *might* be the forerunner of an entrance on a scene, undisturbed by sorrow. But the situation of the Atheist is rendered affecting by its connexion with *eternity*! ETERNITY is bursting upon him—the grave yawns

to receive him—and we see him cutting himself off from hope of mercy, by his daring hardihood and mad-like rage, But—he will awake beyond the precincts of time and its narrow bounds—he will awake—to his utter confusion—in ETERNITY!

“Where all his secret guilt will be reveal’d,
Nor the minutest circumstance conceal’d.”

May *we*, Lorenzo, die the death of the righteous; and may *our* last end be like his!

But there is yet another character, the Deist, who is equally inconsistent with the unbeliever in the Deity, because he professes to venerate the Creator and to worship in the temple of Nature and of Reason, and yet spurns at the Revelation of the Most High. *His* sage pretensions on these points, you know, Lorenzo, I intended to combat at the end of the discussion, and to shew, that there are as good reasons for believing in the Divinity of the Book of God, as there are for believing in the Divinity of the Book of Nature. But this will now form a work of itself, in an enquiry into the analogy between the discoveries of the God of Nature, and Him whom we denominate the God of the Bible.

THE END.







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